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HOW LABOR IS USED ON RED RIVER VALLEY FARMS

J. G. MacKenzie and J. C. Brown

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J. G. MacKENZIE and J. C. BROWN
ECONOMICS DIVISION

INTRODUCTION

Labor is one of the most important variable inputs of farm production. Progress in the production of market crops and in the general development of agriculture in Manitoba during the past sixty years has resulted in a marked reduction in the amount of labor required per acre of cultivated land. The factor most responsible for this decrease in labor requirements has been the development of more suitable farm machines. Today, because of improvements in types and designs of tractors, the horse has been completely displaced as a source of farm power in many grain growing areas. Often, the same amount of work that was formerly done by several teams and teamsters is now done by one man with one large power unit.

The amount of labor required in crop production varies from area to area depending primarily on the suitability of the area for mechanization and the adaptation of modern mechanized innovations by farm operators. In an effort to determine the labor time required for crop production in the more highly mechanized farming areas of Manitoba, a study was undertaken in the Red River Valley. This was based on the collection of data on the actual labor inputs relevant to the production of the various field crops. The study was conducted by the Economics Division, Marketing Service, Canada Department of Agriculture in co-operation with the Department of Political Economy, University of Manitoba.

The specific objectives of the study were:

1. To determine the amount of crop-labor required per acre in the production of the principal grain crops and of special crops such as sugar beets, sunflowers and corn.
2. To determine what factors are responsible for variations in crop-labor requirements between different farms.
3. To determine the distribution of labor among the farm enterprises.

Farms visited were selected at random. The 150 records taken were representative of all the common farm size-groups and types of farms in the area. Farms with less than 50, or more than 1,500

assessed acres, were excluded from the sample. The labor record covered the time period from October 1, 1951 to September 30, 1952. For the purpose of analysis the record year was divided into four time periods, in each of which the labour requirements were considered to be fairly uniform; winter period (October-March), seeding period (April-May); summer period (June-July); and harvest period (August-September).

Data relating to the use of labor were obtained in two visits to each farm. The first visit followed the seeding period and the second followed the harvest period. Information was obtained on: composition of the farm labour force; land utilization; labor used for all operations relevant to crop production, livestock production and general farm maintenance; machinery inventory and use of machines; livestock inventory, livestock sold, dairy and egg production; crop yields; and conditions that might cause a deviation in the amount of time required in crop production during the survey year in relation to the long-time average.

DESCRIPTION OF THE AREA

Location

The area under survey is situated in the south-central part of the Red River Valley (Figure 1). This area includes all the land within the boundaries of Morris and Rhineland municipalities and borders the International Boundary on the south and the Red River on the east. Morris, Altona and Plum Coulee are the principal towns.

Soils

The soils of the Red River Valley have developed on a heavy lacustrine plain which was formerly treeless and covered with tall and prairie and wet-land grasses.¹ Soils of the area are black earths composed of several phases that range in texture from medium loam to heavy clay. These soils are of good depth, fertile, stone free, and although they are heavy to till are ideally suited for grain growing and garden crops. There is no moisture conservation problem but wind erosion occurs frequently.

Drainage

This area lies in the bed of glacial Lake Agassiz and its topography is remarkably level. Association with the flat topography is the problem of drainage and flooding. The Morris River which rises in the Pembina Hills to the west and a few creeks

¹ Ellis, J. H., *The Soils of Manitoba*. Economic Survey Board, Province of Manitoba, 1938, pp. 45-49.

DUCK MOUNTAIN
FOREST RESERVE



and coulees that have their source in the area flow eastward and empty into the Red River. During the spring runoff and heavy summer rains these drainage channels are often inadequate to carry the overflow of water and local flooding causes damage to crops. Previous to settlement, part of the area was swampy. Since then an extensive drainage program has been undertaken and the local areas that were formerly wet meadow land are now cultivated and used for grain production.

Climate

The climate of the area is generally more favorable than that prevailing over the eastern sections of the Prairie Provinces and is suitable for such crops as sugar beets, corn and sunflowers. Considering 29.5°F. as the critical temperature for frost injury to crops, the frost-free period ranges from 130 to 140 days, with the longer period applying mostly to the southwestern part of the area. Precipitation averages from 19 to 20 inches per year with eight to nine inches falling during the growing season. The average mean temperature for the months of April to September is 56.4°F. at Winnipeg and 56.8°F. at Morden.

Settlement and Progress

Settlement of the area began around 1875. Many of the early settlers were German and Dutch immigrants of the Mennonite faith. Today, the people of Rhineland municipality are nearly all descendants of these early German or Dutch settlers; the Morris municipality comprises descendants of early French, English, Scottish and Irish settlers and people of German and Dutch origin.

In Morris the rural population has increased gradually (Table 1). In the early days a considerable part of this municipality consisted of swamp lands unsuitable for cultivation and so settlement was dependent to a large extent on drainage. In Rhineland, settlement took place more rapidly because less drainage was required. In both municipalities there was a decrease in population after 1941, mainly because of an increased industrial demand for labor as a result of war conditions.

The total acreage and the percentage of that acreage in improved land increased between 1916 and 1951 (Table 2). During these years the percentage of the improved land in grain crops remained about the same but the acreage in special crops such as sugar beets, sunflowers and corn increased from 0.1 to 3.1 per cent and the acreage in legumes, grasses and improved pasture increased from 2.1 to 8.9 per cent. At the same time, the acreage in summerfallow decreased from 26.1 to 14.1 per cent. This decrease in summerfallow acreage indicates that as agriculture progressed in this area a more intensive use was made of land through increased acreages of tilled crops, legumes and grasses in the rotation.

Table 1.- Population by Census Years, Morris and Rhineland Municipalities, 1901-1951

Census year	Morris	Rhineland
1901	2,027	7,832
1906	2,382	7,424
1911	3,143	7,270
1916	3,159	7,966
1921	3,817	8,400
1926	3,996	8,281
1931	4,737	8,314
1936	4,763	8,537
1941	5,095	8,936
1946	4,770	7,406
1951	3,615	5,829

Source: Census of Canada.

Table 2.- Total Acres, Improved Acres, Cropland Use and Per Cent of Total Acreage in Improved Land by Census Years Morris and Rhineland Municipalities, 1916-1951

Census year	Total : area in farms	Improved : area	Common : grain crops	Special : crops	Legume : grasses and other	Summer fallow	Per cent : of area improved
			- acres -				- per cent -
1916	433,599	349,776	250,322	373	7,426	91,155	80.7
1921	443,010	361,451	277,560	394	33,704	69,793	86.1
1926	425,517	376,016	294,556	569	25,491	55,400	88.4
1931	466,084	413,115	282,683	6,262	43,870	80,300	88.6
1936	464,540	425,164	318,442	2,170	48,067	56,485	91.5
1941	480,861	463,493	329,674	3,598	54,229	75,992	96.4
1946	467,563	433,137	299,646	17,773	43,995	71,723	93.7
1951	469,127	455,749	336,378	14,213	40,611	64,342	97.1

Source: Census of Canada.

Cattle numbers increased steadily in Morris municipality from 1916 to 1941, and then decreased slightly, in Rhineland there was a decrease from 1916 to 1936, followed by an increase with a maximum number in 1946 (Table 3). There was considerable fluctuation in hog numbers with peak production in 1941. During World War I tractors were introduced in this area as a source of field power and horses decreased in both municipalities after 1916.

Railways, highways and market roads provide the area with adequate transportation facilities. Several towns within and adjacent to the area supply local servicing and marketing facilities. Of particular importance are an oil-seed processing plant at Altona equipped to handle sunflowers and soybeans; a canning factory at Morden for such crops as sweet corn, tomatoes and peas; and facilities for loading sugar beets onto railway cars for

shipment to the refinery at Winnipeg.

Table 3.- Livestock Numbers by Census Years, Morris and Rhineland Municipalities, 1916-1951

Census :	Morris			:	Rhineland		
year :	Horses	Cattle	Hogs	:	Horses	Cattle	Hogs
- numbers -							
1916	4,987	3,723	4,060	10,709	8,929	6,612	
1921 ¹							
1926 ¹							
1931	4,245	4,991	6,397	6,828	3,290	9,084	
1936	3,516	5,343	6,072	6,217	7,898	7,676	
1941	2,209	5,804	14,882	4,717	8,760	17,344	
1946	1,243	5,418	7,321	2,644	9,405	8,343	
1951	733	3,250	5,332	1,311	6,477	8,297	

¹ Data not available.

Source: Census of Canada.

FARM ORGANIZATION

Land Use

Farms averaged 352 assessed acres in size and 94 per cent of this acreage was in improved land. The unimproved land was made up mostly of river and coulee banks or constructed drainage channels. It may be expected that, under normal conditions, little or no more land will be cleared for cultivation. Of the cultivated land 75 per cent was in grain crops; three per cent in special crops; five per cent in legumes, grasses or improved pasture; and 17 per cent in summerfallow (Table 4).

The percentage of the total cultivated acreage in grain crops was about the same for all farm size-groups but the importance of individual crops varied with size of farm. On farms having more than 560 acres of cropland wheat was the most important crop and almost equalled the combined acreages of all other grain crops. On farms having less than 120 acres of cropland oats were the most important crop. Barley was equally important on all farm size-groups, but flax was more important on the smaller farms. Other grain crops, mostly millet and buckwheat, were grown on few farms.

During the past 15 years special crops such as sugar beets, sunflowers, corn (shelled), peas and soybeans have been grown commercially in Manitoba. The acreage in these crops is concentrated mainly in the southern part of the Red River Valley. Sugar beets are grown under contract with the Manitoba Sugar Company and the acreage seeded does not vary greatly from year

to year. For all Manitoba, in 1952, there were 16,411 acres in sugar beets; 19,700 acres in shelled corn; and 3,500 acres in sunflowers. In 1949 there were 60,000 acres in sunflowers¹ but due to an epidemic of rust and bacterial disease there was a reduction in the acres sown to this crop following 1949.

Table 4.- Percentage Distribution of Land Use According to Size of Farm, Morris and Rhineland Municipalities, 1952

	: Size of farm (Cropland acres)					: All
Land use	:50-120:	121-240:	241-400:	401-560:	561-more:	farms
	- per cent -					
Wheat	18	28	30	32	35	32
Oats	23	15	13	12	12	13
Barley	21	21	20	21	20	20
Flax	13	9	8	8	7	8
Other grain	2	2	2	2	1	2
Special crops	9	6	4	3	1	3
Legumes, grasses and improved pasture	3	4	4	3	6	5
Summerfallow	11	15	19	19	18	17
Total	100	100	100	100	100	100
Total, cultivated acres	87	179	292	469	766	321
Total, assessed acres	100	193	321	484	803	342
Number of farms	25	46	39	22	23	155

Although the acreage in special crops made up a small percentage of the total cultivated acreage for the study area, these crops were important in the farm organization on many farms. Of all the farms included in the study, 37 had an average of 18 acres in sugar beets; ten had an average of 28 acres in sunflowers; 22 had an average of 17 acres in corn; 14 had an average of 24 acres in peas; and three farms had an average of 12 acres in soybeans.

Livestock

A limited natural water supply hinders livestock production in this area. Few wells are available and most farms have a

¹ Report on Crops and Livestock, etc., The Department of Agriculture and Immigration, Province of Manitoba, 1949-52.



Rural Electrification has added to the comforts of the modern new farm home.



Typical harvest scenes. Nearly all grain is swathed and combined.

dugout or a dammed coulee which stores surface water for livestock use. The distribution of the different kinds of livestock by size of farm is shown in Table 5.

Horses

Although horses were found on about three-quarters of all the farms only one operator reported having a four-horse team. For the most part, horses were used for odd chores around the yard and for driving to town in the winter. Where an operator had only one horse a second one was often borrowed from a neighbor for jobs that required a two-horse team. A further decline in horse numbers is indicated by the fact that colts were foaled on only two of the surveyed farms.

Cattle

Some cattle were kept on about 95 per cent of the farms. Several pure-bred beef and dairy herds are found in the area but most cattle are of mixed breeding and used for both dairying and beef. Seven farms had 15 or more cattle but the average for all farms was only 5.9 head. Generally, the larger farms had a few more cattle than the smaller farms with about the same number of cows being milked in all farm size groups.

Table 5.- Average Livestock Numbers According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1951-52

	:	:	Cattle	:	Hogs	:
	:	:	Milk	:	Other	:
Size of farm	:	Horses	:	cow	:	cattle
	:	:	:	Sows	:	hogs
	:	:	:	:	:	Hens
	- numbers -					
50 - 120 acres		1.0		2.3		2.0
121 - 240 acres		1.1		2.6		2.5
241 - 400 acres		1.4		2.8		2.6
401 - 560 acres		1.1		2.5		3.3
561 acres and over		1.6		3.4		6.4

Hogs

On most of the farms, hog production was only a sideline enterprise. On the average there were 1.4 sows and 5.4 other hogs per farm; the larger farms generally had a larger number than the smaller farms. Many farmers preferred to purchase weanlings to provide the family with a supply of pork rather than keep a brood sow. About 88 per cent of all farms kept some hogs during at least part of the survey year.

Poultry

Poultry was a specialized enterprise on many farms in the area. Several farms had a flock of 500 or more hens and one farm had 1,000 birds. Other poultry was generally unimportant, although a few farms kept turkeys on an extensive scale.

Livestock Products

Nearly all farmers milked cows and many sold some cream but dairying was carried out as a major enterprise on few farms. The usual practice was to supply the family with milk and possibly butter and to sell cream whenever a surplus occurred. In many cases a cow supplied the home with milk and at the same time nursed a calf. As a result the average production per cow, as measured in terms of milk produced for home use, was low. For all farms, an average of 1,680 gallons of milk were produced and 96 gallons of cream were sold. Cattle sales averaged about one per farm. Marketed cattle were mostly sold as calves or yearlings; the average weight at time of sale was 550 pounds. Dairy, hog and poultry production according to size of farm is summarized in Table 6.

Table 6.- Average Livestock Production According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1951-52

Size of farm	Cattle			Hogs		Poultry	
	:Sold and:		:	:Sold and:		:Sold and:	
	: home	: Milk	: Cream:	: home	: home	: Eggs	
	: used	: produced:	: sold:	: used	: used	: produced	
	no.	- gallons -		- number -		- dozen -	
50 - 120 acres	0.9	1,725	81	4.3	101	1,105	
121 - 240 acres	1.1	1,676	108	3.8	179	1,973	
241 - 400 acres	0.8	1,474	98	7.0	125	2,853	
401 - 560 acres	1.7	1,151	63	6.3	206	1,678	
561 acres and over	1.3	2,298	113	6.2	67	1,590	
All farms	1.1	1,680	96	5.4	139	1,942	

An average of 5.4 hogs per farm were sold or butchered for home use. The larger farms kept a few more hogs and also sold a larger number than the smaller farms. The hogs sold were mostly hogs finished for market. The average weight for these hogs was 194 pounds while those that were home butchered averaged 218 pounds.

Many farmers sold hatching eggs under the Manitoba Approved Flock Policy. Egg production averaged 1,942 dozen per farm or about 15 dozen per hen in the survey year. A common practice was to

sell the old hens every summer and replace the laying flock by buying chicks from a hatchery. A few farmers bought cockerels or turkey poults in the spring and sold them in the fall. The medium-size farms tended to have the largest poultry enterprises and also the highest egg production per hen.

Labor Force

Labor Supply

Farm labor may be expressed in "Man equivalents". In this calculation one man equivalent represents one adult male worker capable of working at full capacity and on the farm for an entire year or an equivalent amount of labor force made up by other workers. All workers were given a rating based on their individual labor capacity and available time relative to one man equivalent. The composition of the labor force, as expressed in man equivalents is illustrated in Table 7.

Table 7.- Man Equivalents According to Class of Worker and Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1951-52

	: <u>Cropland acres</u> :					All
Class of worker:	0-120:	121-240:	241-400:	401-560:	561-more:	farms
	- man equivalents -					
Operator	0.94	0.94	0.93	0.92	0.90	0.93
Full-time family	0.11	0.28	0.46	0.64	1.02	0.46
Other family	0.20	0.24	0.25	0.20	0.34	0.25
Hired	0.04	0.05	0.18	0.25	0.35	0.15
Total	1.29	1.51	1.82	2.01	2.61	1.79
Number of farms	24	42	35	20	22	143

The farms are for the most part family farms. The operator and his family, with possibly some hired seasonal help, supplied the labor. The operator was the man who managed the farm and was responsible for all business decisions. In cases where two or more brothers operated a farm jointly, one was considered as the operator and the others as full-time family labor. The full-time family labor generally represented sons or brothers of the operator and these men, together with the operator, represented the permanent labor force on the farm. Other family labor included mostly wives, daughters, school children and aged fathers of the operators. Hired labor represented all members of the labor force who received a wage in return for their labor; in a few cases it included sons who were working under a definite wage agreement.

To determine the total hours of available labor supply, the operators were asked to estimate the hours of time during the survey year that the individual members of the labor force had at their disposal for the various farm tasks. The total labor supply averaged 6,200 hours per farm for all farms (Table 8).

Table 8.- Hours of Available Labor Supply per Farm According to Class of Worker and Season, 143 Farms, Morris and Rhineland Municipalities, 1951-52

	Season				
Class of worker:	Oct-March:	Apr.-May:	June-July:	Aug.-Sept.:	All year
	- hours -				
Operator	1,012	681	723	602	3,218
Full-time family	465	382	444	506	1,797
Other family	110	107	173	212	602
Hired	59	81	200	243	583
Total	1,646	1,251	1,540	1,763	6,200

Many operators, either because of partial retirement or diminished physical ability, contributed only a few hours of labor daily; a few contributed only the time necessary for management and business. Labor hours supplied by operators averaged 52 per cent of the total labor supply for all farms, but decreased in importance from 73 per cent of the total on the farms with less than 121 cropland acres to 35 per cent on farms with 561 or more cropland acres.

Some brothers of the operator usually contributed a full day's work and represented on the average 29 per cent of the total labor supply for all farms. This class of worker was more important on the larger farms where he contributed 45 per cent of the total labor hours compared with ten per cent on the small farm size-group.

For the most part the operators' wives contributed to the labor supply on all farms but usually only a few hours per day. Similarly, daughters and school children contributed a few hours per day or perhaps a few hours per week. The total hours of labor contributed by wives and children averaged ten per cent of the total supply for all farms.

Some labor was hired on all farm size-groups. On the smaller farms workers were mostly hired by the day for harvesting grain, or contracted by the acre for weeding and thinning sugar beets. The contracted sugar beet labor was usually made up of families which included elderly men, women and teen-age children. Several of the larger farms hired labor by the month and four farms hired labor for the entire year. The paid labor included mainly young

men or boys capable of doing the same work as a grown man.

Seasonal Distribution of Labor

During the winter period the available labor supply averaged 1,646 hours per farm (Table 8), which amounted to 27 per cent of the total supply for the year. Many of the visited farms had little or no livestock and operators were thus able to take their holidays during the winter season. Also, during this period some of the full-time family labor was absent from the farm and employed in other work.

The labor supply during the seeding season amounted to 20 per cent of the total available supply. The crop-labor requirements during April and May would cover about six weeks. For the June-July period the labor supply was 25 per cent of the total for the year and for the August-September period which included harvesting, was 28 per cent of the total.

The operator's contribution to the labor force was most important during the winter months, in which period he supplied 61 per cent of the total hours. During the same period hired labor supplied four per cent of the total hours. For the August-September period, the operator's labor contribution decreased to 45 per cent of the total hours but the hired labor hours increased to 14 per cent of the total. The contribution of the full-time family labor was about equally important in all time periods. Other family labor made up a larger proportion of the available labor in the summer and harvest period when school children devoted more hours to farm tasks.

Power and Equipment

Although most of the farms are highly mechanized, few operators owned all the machines used for field operations. All but one of the farms with less than 121 cropland acres required the use of hired or borrowed machinery. The larger farms had fuller lines of equipment; 65 per cent of all farms with 561 or more cultivated acres either rented or borrowed some machines. The most common machines hired or borrowed were weed sprayers and the seeding and harvesting equipment used for special crops. The number, age and size of the common implements is described in Table 9.

Special Equipment

There were more tractors than any other kind of machinery. Of all the farms studied 75 had one tractor, 63 had two tractors, 15 had three tractors, and one had four tractors. Only one farm had no tractor. Several of the larger farms kept a small tractor for yard work or odd chores, where it partly replaced a team of horses. The two-plow tractor was the most common size on the

farms with less than 241 cultivated acres and the three-four-plow tractor was the most common size on the farms with more than 241 cultivated acres. The average age of all tractors was nine years but the smaller farms had older models than the larger farms.

Table 9.- Kind, Number, Age and Size of Machines per Ten Farms and per 100 Acres of Cropland, 155 Farms, Morris and Rhineland Municipalities, 1952

Kind of machine	:	:Machines:Machines per:			:	: Most common size
	:	Total	per 10	100 acres	Average	
	:	machines	farms	of cropland	age	
		- number -			- years -	
<u>Special equipment</u>						
Tractor		252	16.2	0.50	9	3-4 plow
Combine		120	7.7	0.24	7	12 foot
Swather		103	6.6	0.20	8	12 foot
Truck		118	7.6	0.24	7	1 ton
Car		119	7.6	0.24	8	-
<u>General equipment</u>						
Plow		172	11.1	0.34	11	3 bottom
Oneway		60	3.9	0.12	8	6 foot
Disk		50	3.2	0.10	2	12 foot
Cultivator		163	10.5	0.33	10	10 foot
Disk harrow, double		21	1.4	0.04	14	10 foot
Disk harrow, single		29	1.9	0.06	10	21 foot
Drag harrow		173	11.2	0.35	15	30 foot
Packer		21	1.4	0.04	28	12 foot
Weed sprayer		49	3.2	0.10	4	30 foot
Drill		146	9.4	0.29	12	10 and 14 foot
Binder		51	3.3	0.10	20	7 foot
Mower		91	5.9	0.18	21	5 foot
Rake		83	5.4	0.17	23	10 foot

Although almost all grain was combined, there were only 7.7 combines per ten farms. All farms having over 400 cropland acres had a combine but many of the smaller units had their grain crops custom harvested. Swathers averaged 6.6 machines per ten farms and were more numerous on the larger farms. Five of the surveyed farms reported a thresher but only two of these were used during the survey year. About 30 per cent of the farms had a binder which was used mainly to cut sheaf feed for livestock.

Although about one-half the operators baled feed or bedding for livestock only five farms had balers and only one had a bale loader. One farm purchased a forage harvester during the year of the survey and used it on 20 acres of corn. Beet lifters were found on 12 farms, eight of which had less than 241 cultivated

acres. Three beet harvesters and one corn picker were reported. In most cases, beets were topped by hand following the operation of the beet lifter. These special machines, being costly in relation to the acreage of land requiring their use on individual farms, were generally custom hired.

General Equipment

One of the most common items of general equipment was the plow; on the average there were 11.1 plows per ten farms. The size of plow was generally in direct relation to the size of the tractor. The two-furrow plow was most common on the smaller units and the three-furrow plow on the larger units. In recent years the importance of the plowing operation has declined because of the greater use of surface tillage machines, especially diskers. On many farms the plow is rather old and used only to a limited extent.

Diskers resemble oneways in construction and tillage performance and are best adapted to large fields; they were common only on the larger farms. Many of these machines had seeder attachments and were also used in the seeding operation. Oneways, cultivators, drag harrows and grain drills were common on all farm size-groups. Weed sprayers averaged 3.2 machines per ten farms. The greatest number of these machines was found on the largest farms. About two-thirds of all farms sprayed for weed control during the survey year; this indicates the extent to which custom work by this kind of machine was employed, especially on the smaller units.

Seven beet seeders and 15 corn seeders were reported. Thirty-seven farms had sugar beets and 24 farms had corn, which indicates to what extent these seeders were borrowed or custom hired. There was a limited number of many other machines. Four rod weeders were used but only to a limited extent. Mechanical grain loaders, either in the form of a truck auger or a portable grain auger, were kept on 55 per cent of all farms. Although the area is fully electrified and many farms have machine repair shops, there was only one electric motor per ten farms. These motors ranged in size from one-quarter-h.p. to four-h.p. and were distributed over the various farm size-groups. One operator reported having a farm-hand. One subsoiler was purchased during 1952 and used to till ten acres.

Machinery Investment

The high degree of mechanization is reflected in the relatively high investment in machinery (Table 10). For all the farms studied the total machinery investment averaged \$6,363 per farm, an amount which ranged from \$2,479 per farm on the farms with less than 121 cropland acres to \$11,289 per farm on the farms with 561 or more cropland acres. The average machinery investment per

acre of cropland was \$19.82, and ranged from \$28.49 per acre on the small farm size-group to \$14.74 per acre on the large farm size group.

Table 10.- Capital Investment in Machinery According to Size of Farm, Morris and Rhineland Municipalities, 1952

Kind of equipment	: Size of farm (Cropland acres)					: All farms
	:0-120	:121-240	:241-400	:401-560	: 561-more	
- dollars -						
Special equipment	1,846	3,688	4,862	6,982	9,037	4,948
General equipment	633	965	1,535	2,161	2,252	1,415
Total	2,479	4,653	6,397	9,143	11,289	6,363
Investment per cropland acre	28.49	25.99	21.91	19.49	14.74	19.82
Number of farms	25	46	39	22	23	155

Investment in special machines made up a larger percentage of the machinery investment on the larger farms. It was only on the larger units that self-propelled combines were common and where a car and truck were both found on the same farm. On farms in the largest size-group combine investment averaged \$2,826 per farm and was the largest capital item of machinery. Tractors were next in importance, followed by cars and trucks which were about equal in value. Other special equipment included forage harvesters, balers and harvesting equipment for special crops and represented a greater investment on the largest than on the other farms. On farms in the smallest size-group the investment in tractors averaged \$945 per farm and amounted to about one-half the total value of special equipment. Trucks were next in importance, followed by cars. There was only a small investment in combines and swathers on these farms.

Rates of Performance

The tractor-hours and man-hours required per acre with the common size machines, travelling at average speed, are given in Table 11. In all cases the man-hours are greater than the tractor-hours, the difference being the time required by the operator to make small adjustments in the field and for daily servicing. For seeding, spraying, or harvesting, all rates refer to field operations on grain crops only. The time required for these operations in the production of such special crops as sugar beets, sunflowers or corn is not included. The rates for the tillage machines cover field operations for all crops. Where individual machines are either narrower or wider than the average size, but travel at average speed, their rate of performance would be directly

related to that of the width of the common size machine, as shown in Table 11.

Table 11.- Rates of Performance of the Most Common Size Machines, 155 Farms, Morris and Rhineland Municipalities, 1951-52

Kind of machine	: Size of machine :	Rate of travel :	Tractor-hours per acre	Man-hours per acre
		- miles per hour -	- hours -	
Plow, moldboard	3-14-inch	4.0	.82	.93
Oneway	6 foot	4.0	.47	.52
Disk	12 foot	4.5	.21	.24
Disk, single	21 foot	4.0	.14	.16
Disk, double	10 foot	4.0	.28	.32
Harrow, drag	30 foot	5.0	.09	.10
Cultivator	10 foot	4.0	.28	.33
Drill	14 foot	4.5	.22	.27
Disk	12 foot	4.0	.23	.28
Sprayer	30 foot	5.5	.11	.14
Combine, S.P.	12 foot	3.0	.37	.43
Combine, A.M.	6 foot	3.0	.67	.78
Swather	12 foot	4.5	.21	.23

In the case of plows, oneways and diskers, the speed was found to vary considerably from farm to farm and from field to field, depending on the soil conditions at the time of operation. Unless the soil is quite dry in this area the speed of the machines is greatly reduced. The other machines, which operate under generally dry conditions, had fairly constant individual rates of speed.

LABOR USE IN CROP PRODUCTION

Labor Requirements

Time requirement per acre for operations relating to the production of field crops and tillage of summerfallow was calculated on the basis of machine-hours and man-hours for each season (Tables 12 to 30). In these calculations machine-hours represent the actual time that the individual machines were in operation; man-hours include such tasks as daily servicing and caring for machines, making adjustments and minor repairs, as well as time spent operating the machines.

In the analysis of the labor used on wheat, oats, barley, flax and summerfallow the farms were divided into three farm size-groups: farms with less than 121 acres of cropland; farm ranging in size from 121 to 400 acres of cropland; and farms with 401 or

more acres of cropland. These size-groups included the small, medium size and large farms respectively. For buckwheat, sugar beets and corn, crops not grown to a great extent, all farms were grouped together.

Fifty-five per cent of the acreage seeded to wheat and most of the acreage seeded to the other crops was on land which had been cropped the previous year. Therefore, time requirement per acre was calculated for each crop grown on stubble land; time requirement per acre for tillage operations on summerfallow was calculated separately. To determine the time requirement per acre for all operations in the production of a crop grown on summerfallow, the time required per acre for pre-seeding, drag-harrowing and cultivation, seeding, post-seeding, and harvesting operations of that crop should be added to the total time requirement per acre for the tillage of summerfallow for the same farm size-group.

Grain Crops

The same general cultural practices were employed in growing wheat, oats, barley, flax and buckwheat. When these crops were grown on land which had been cropped the previous year the common practice was to plow, one-way or disker the land in the previous fall and cultivate or disker and then drag-harrow in the spring before seeding. Frequently the stubble was burned off in the fall and the land was surface tilled with a disker, cultivator or disk-harrow. Part of all the grain crops was seeded with the disker. When this implement was used in the seeding operation usually one less cultivation and one less drag-harrow operation were required before seeding. The grain land was all drag-harrowed once or twice after seeding. All the wheat, barley, flax and buckwheat, and most of the oats were swathed and combined.

Each of the grain crops had the same general time requirement (Table 12 to 24). Time required for wheat amounted to an average of 2.95 machine-hours and 4.48 man-hours per acre on the small farms, 2.73 machine-hours and 4.05 man-hours per acre on the medium size farms, and 2.05 machine-hours and 3.00 man-hours per acre on the large farms. Oats and barley required slightly more labor hours per acre than wheat. On many farms these two grains were used as cleaning crops, in which case seeding was delayed and additional tillage was done for weed eradication. Some oats, too were cut with a binder and this operation, together with stooking, hauling, stacking or chopping, required more time than would swathing and combining. Flax and buckwheat required more labor hours per acre than either oats or barley; both of these crops were generally seeded late and considerable time was spent on preseeding tillage operations. Time required for flax amounted to an average of 4.20 machine-hours and 5.72 man-hours per acre on the small farms, 3.00 machine-hours and 4.51 man-hours per acre on the medium size farms, 2.27 machine-hours and 3.33 man-hours per acre on the large farms; for buckwheat, an average of 3.37 machine-hours and 4.75 man-hours per acre was required for all farms.



A heavy stand of sunflowers.



Harvesting sunflowers with a self-propelled grain combine which is equipped with a special cutting bar attachment.



The oil seed processing plant at Altona and the vegetable canning factory at Morden provide a market for special crops.

Sugar Beets

Time required for operations involved in the production of sugar beets grown on land which had been cropped the previous year averaged 8.33 machine-hours and 48.56 man-hours per acre for all farms (Table 25).

In previous fall and pre-seeding spring tillage operations, 63 per cent of the beet acreage was plowed, four per cent was onewayed, nine per cent was disked and 39 per cent was packed. During these periods the total beet acreage was also cultivated about two times (an average of $2 \frac{1}{3}$ times) and drag-harrowed about four times. Time required for all pre-seeding tillage operations on beet land averaged 1.34 machine-hours and 2.17 man-hours per acre.

Because of dry weather at seeding time and poor germination, much of the beet acreage was reseeded once and some land was reseeded twice. The time required for this operation averaged 0.82 machine-hours and 1.05 man-hours per acre.

Post seeding operations included packing, drag-harrowing, cultivating, weeding and thinning, and spraying. Only a few operators reported using the packer or drag harrow after seeding. All beet land was row-cultivated about three times (an average of $3 \frac{1}{3}$ times) during the summer. Time required for weeding and thinning was the most important item during this period, amounting to 24.49 man-hours per acre. Almost one-half the beets were sprayed for insect control.

The beet harvester (which tops, lifts and loads in one operation) was used to harvest 58 per cent of the total acreage. The lifter machine, which was used to lift the remaining 42 per cent of the beets, required 0.65 machine-hours and 0.39 man-hours per acre. Time required for topping (hand labor) amounted to an average of 6.52 man-hours per acre; loading, 0.46 machine-hours and 2.22 man-hours; hauling, 0.98 machine-hours and 4.34 man-hours; and other labor required 0.07 machine-hours and 0.64 man-hours per acre. Total time required for all harvesting operations required an average of 3.43 machine-hours and 17.50 man-hours per acre.

Sunflowers

Sunflower production required the same cultural practices, except for post-seeding cultivation and hand weeding, as did the common grain crops. The time required to produce this crop on land which had been cropped the previous year averaged 2.31 machine-hours and 5.80 man-hours per acre for all farms (Table 26).

In previous fall and pre-seeding spring tillage operations 43 per cent of the sunflower acreage was plowed and 54 per cent

was disked in the fall, 55 per cent disked in the spring, seven per cent was cultivated in the fall and 85 per cent cultivated in the spring. All land was harrowed (an average of $1\frac{1}{2}$ times) in the spring and a few farms did some fall and spring disk-harrowing. Total hours of time required for these operations averaged 1.08 machine-hours and 1.25 man-hours per acre.

The seeding operation was done mostly with the grain drill and required 0.34 machine-hours and 0.46 man-hours per acre. Following the seeding operation all the sunflower acreage was harrowed and most of this land was row-cultivated. Hand weeding was done on seven per cent of the total acreage and required an average of 1.05 hours of labor per acre.

The usual method of harvesting sunflowers for oil seed is to straight combine late in the fall after frost. However, the survey year was unfavorable for oil seed production and 29 per cent of the crop was cut for fodder. The total time required for all harvesting operations was 0.83 machine-hours and 1.56 man-hours per acre.

Corn

Both fodder and grain corn are grown in this area. Time required for the production of corn on land cropped the previous year averaged 4.23 machine-hours and 10.64 man-hours per acre (Table 27).

In the previous fall 75 per cent of the corn land was plowed, 15 per cent was disked and 42 per cent was drag-harrowed. In the pre-seeding spring operations four per cent was plowed, 48 per cent was disked and all land was cultivated and drag-harrowed. Time required for all pre-seeding tillage operations required an average of 1.24 machine-hours and 1.42 man-hours per acre.

About 60 per cent of the corn acreage was seeded with a grain drill and 40 per cent with a corn drill. Following seeding all the corn acreage was harrowed about twice and row-cultivated more than twice (an average of $2\frac{1}{2}$ times). Hand weeding was done on 61 per cent of the total acreage.

Several methods were used in harvesting this crop. Most of the corn harvested for fodder was cut with the binder. Two per cent was cut with the swather and baled. A mechanized picker was used on 76 per cent of the crop; most of this corn was also shelled. Ten per cent of this crop was hand picked. Total time for all corn harvesting operations averaged 1.22 machine-hours and 4.09 man-hours per acre.

Summerfallow

The summerfallow acreage of 1951 was seeded in 1952. Therefore,

the 1951 acreage is used to determine the time required per acre for tillage operations on summerfallow (Tables 28, 29 and 30). Included in these calculations are the tillage operations in the fall of 1950.

Time required for summerfallowing averaged 2.62 machine-hours and 3.58 man-hours per acre on the small size farms, 2.28 machine-hours and 3.08 man-hours per acre on the medium size farms, and 1.45 machine-hours and 1.93 man-hours per acre on the large size farms.

Nearly two-thirds of the summerfallow land was fall-tilled with either the plow, oneway, disker, cultivator or disk-harrow. In the spring the land was plowed, onewayed or disked. During the summer all fallow land was cultivated about three times and drag-harrowed about twice. In addition to the summer cultivation and harrowing, about 20 per cent of this land was tilled with the disk-harrow. No operators reported the use of sprays to control weeds on summerfallow land.

Overhead Tasks of Crop Production

In crop production there is labour involved in seed cleaning and treatment, hauling grain from storage bins to market, and repairing machinery which must be accounted for in estimating the total time required per acre for individual crops. In this study such labor is considered as overhead labor for crop production. The labor used in seed preparation and marketing grain has been allocated proportionally to the individual crops on the basis of the seeded acreage of each crop; the labor used in repairing machinery has been allocated proportionally to each crop and to summerfallow.

For all farms, an average of 0.22 man-hours per acre was required for seed preparation; 0.20 man-hours per acre for marketing grain; and 0.43 man-hours per acre for repairing machinery (Table 31). As farms increased in size there was a considerable decrease in man-hours required per acre for repairing machinery. For seed preparation and marketing grain this decrease was not so pronounced. The large farms had less machinery in relation to acres in cropland than the small farms and so required less time per acre for repair work. On the other hand, it is reasonable to expect that labor used for seed preparation and marketing grain would generally be in close relation to the actual acres of cropland per farm.

Table 12.- Wheat Produced on Stubble Land: Machine-and
Man-Hour Requirement per Acre According to Season and
Operation, 25 Farms, (50-120 Acres of Cropland)
Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:	:	:	:	:
	:Machine-	:Machine-	:Machine-	:Machine-	:Man-hours
	:Percentage:hours per:Man-hours:hours for: for	:Percentage:hours per:Man-hours:hours for: for	:Percentage:hours per:Man-hours:hours for: for	:Percentage:hours per:Man-hours:hours for: for	:Percentage:hours per:Man-hours:hours for: for
	: of total : once :per once : total : total	: of total : once :per once : total : total	: of total : once :per once : total : total	: of total : once :per once : total : total	: of total : once :per once : total : total
	:acres done: over : over : acreage :acreage	:acres done: over : over : acreage :acreage	:acres done: over : over : acreage :acreage	:acres done: over : over : acreage :acreage	:acres done: over : over : acreage :acreage
	- per cent -	- per cent -	- per cent -	- per cent -	- per cent -
<u>Fall, 1951</u>					
Plow	56	0.98	1.11	0.55	0.62
Oneway	3	0.52	0.62	0.02	0.02
Disk	2	0.36	0.38	0.01	0.01
Cultivator ¹	4	0.68	0.75	0.03	0.03
Disk, double	3	0.33	0.38	0.01	0.01
Disk, single	30	0.19	0.22	0.06	0.07
			Sub-total	0.68	0.76
<u>Spring, 1952</u>					
Plow	2	1.30	1.40	0.04	0.04
Oneway	-	-	-	-	-
Disk	4	0.28	0.32	0.01	0.01
Cultivator	89	0.46	0.52	0.41	0.46
Disk, double	12	0.45	0.50	0.05	0.06
Harrow, drag	170	0.14	0.18	0.24	0.31
			Sub-total	0.75	0.88
<u>Seeding</u>					
Drill	100	0.32	0.44	0.32	0.44
Disk	2	0.35	0.38	0.01	0.01
			Sub-total	0.33	0.45
<u>Post-seeding</u>					
Harrow, drag	141	0.31	0.17	0.18	0.24
Pack	-	-	-	-	-
Spray	14	0.12	0.14	0.02	0.02
			Sub-total	0.20	0.26
<u>Harvest</u>					
Swath	100	0.25	0.29	0.25	0.29
Combine	100	0.37	0.52	0.37	0.52
Handle grain	100	0.37	0.37	0.37	0.37
			Sub-total	0.99	1.18
Miscellaneous ²					0.95
Total				2.95	4.48

¹ Includes miscellaneous operations not listed.

² Includes seed cleaning and treatment, machinery repair, and hauling grain from storage bins to market.

Table 13.- Wheat Produced on Stubble Land: Machine-Hours and Man-Hour Requirement per Acre According to Season and Operation, 85 Farms, (121-400 Acres of Cropland) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:	:	:	:	:
	Percentage of total	Machine-hours once over	Machine-hours per once over	Machine-hours total acreage	Man-hours total acreage
	: acres done : - per cent -	: over : - hours -	: over : - hours -	: acreage : - hours -	: acreage : - hours -
<u>Fall, 1951</u>					
Plow	60	0.94	1.04	0.56	0.62
Oneway	5	0.41	0.47	0.02	0.02
Disk	14	0.26	0.29	0.04	0.04
Cultivator	5	0.26	0.28	0.01	0.01
Disk, double	4	0.24	0.27	0.01	0.01
Disk, single	19	0.13	0.21	0.03	0.04
			Sub-total	0.67	0.74
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	2	0.50	0.54	0.01	0.01
Disk	16	0.26	0.29	0.04	0.05
Cultivator	49	0.30	0.34	0.15	0.17
Disk, double	16	0.31	0.34	0.05	0.05
Harrow, drag	122	0.11	0.13	0.13	0.16
			Sub-total	0.38	0.44
<u>Seeding</u>					
Drill	93	0.25	0.32	0.23	0.30
Disk	10	0.23	0.35	0.03	0.04
			Sub-total	0.26	0.34
<u>Post-seeding</u>					
Harrow, drag	165	0.11	0.12	0.18	0.20
Pack	3	0.18	0.20	0.01	0.01
Spray	17	0.11	0.13	0.02	0.02
			Sub-total	0.21	0.23
<u>Harvest</u>					
Swath	100	0.22	0.25	0.22	0.25
Combine	100	0.46	0.55	0.46	0.55
Handle grain	100	0.53	0.53	0.53	0.53
			Sub-total	1.21	1.33
Miscellaneous					0.97
Total				2.73	4.05

Table 14.- Wheat Produced on Stubble Land: Machine-Hour and Man-hour Requirement per Acre According to Season and Operation, 45 Farms, (401 Acres of Cropland and Over) Morris and Rhineland Municipalities, 1952

Season and operation	:	:	Average time per acre			
	:	:	Machine-	:	Machine-	Man-hours
	Percentage:	hours per:	Man-hours:	hours for:	for	
	of total	once	per once	total	total	
	acres done:	over	over	acreage	acreage	
	- per cent -		- hours -			
<u>Fall, 1951</u>						
Plow	58	0.59	0.74	0.34	0.43	
Oneway	16	0.27	0.31	0.04	0.05	
Disk	15	0.20	0.22	0.03	0.03	
Cultivator	4	0.24	0.27	0.01	0.01	
Disk, double	-	-	-	-	-	
Disk, single	9	0.25	0.26	0.02	0.02	
			Sub-total	0.44	0.54	
<u>Spring, 1952</u>						
Plow	-	-	-	-	-	
Oneway	-	-	-	-	-	
Disk	24	0.21	0.24	0.05	0.06	
Cultivator	28	0.22	0.25	0.06	0.07	
Disk, double	8	0.21	0.23	0.02	0.02	
Harrow, drag	113	0.08	0.08	0.09	0.09	
			Sub-total	0.22	0.24	
<u>Seeding</u>						
Drill	80	0.21	0.27	0.17	0.22	
Disk	21	0.19	0.22	0.04	0.05	
			Sub-total	0.21	0.27	
<u>Post-seeding</u>						
Harrow, drag	174	0.07	0.08	0.12	0.14	
Pack	2	0.19	0.21	0.01	0.01	
Spray	38	0.09	0.14	0.03	0.05	
			Sub-total	0.16	0.20	
<u>Harvest</u>						
Swath	100	0.19	0.21	0.19	0.21	
Combine	100	0.33	0.39	0.33	0.39	
Handle grain	100	0.50	0.50	0.50	0.50	
			Sub-total	1.02	1.10	
Miscellaneous					0.65	
Total				2.05	3.00	

Table 15.- Oats Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 25 Farms, (50-120 Acres of Cropland) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: Machine- :		: Machine- : Man-hours		
	: Percentage: hours per:		: Man-hours: hours for: for		
	: of total : once		: per once : total : total		
	: acres done: over		: over : acreage : acreage		
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	68	1.14	1.28	0.78	0.87
Oneway	15	0.49	0.53	0.07	0.08
Disk	-	-	-	-	-
Cultivator	29	0.40	0.46	0.12	0.13
Disk, double	8	0.36	0.41	0.03	0.03
Disk, single	6	0.31	0.38	0.02	0.02
			Sub-total	1.02	1.13
<u>Spring, 1952</u>					
Plow	1	1.28	1.43	0.01	0.01
Oneway	14	0.70	0.80	0.10	0.11
Disk	-	-	-	-	-
Cultivator	118	0.52	0.59	0.61	0.70
Disk, double	9	0.40	0.43	0.04	0.04
Harrow, drag	202	0.15	0.18	0.30	0.36
			Sub-total	1.06	1.22
<u>Seeding</u>					
Drill	101	0.34	0.45	0.34	0.45
Disk	-	-	-	-	-
			Sub-total	0.34	0.45
<u>Post-seeding</u>					
Harrow, drag	118	0.15	0.18	0.18	0.21
Pack	16	0.25	0.29	0.04	0.05
Spray	29	0.18	0.25	0.05	0.07
			Sub-total	0.27	0.33
<u>Harvest</u>					
Swath	88	0.28	0.33	0.25	0.29
Combine	81	0.45	0.60	0.36	0.49
Handle grain	81	0.45	0.45	0.36	0.36
Binder	12	0.67	1.24	0.08	0.15
Stook	3	-	2.33	-	0.07
Thresher	-	-	-	-	-
Haul and cut	7	1.09	6.85	0.08	0.48
Bale	7	1.00	2.71	0.07	0.19
			Sub-total	1.20	2.03
Miscellaneous				0.89	
Total				3.89	6.05

Table 16.- Oats Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 72 Farms, (121-400 Acres of Cropland) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: Machine- :		: Machine- : Man-hours		
	: Percentage: hours per:		: Man-hours: hours for:		
	: of total : once		: total : total		
	: acres done: over		: acreage : acreage		
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	56	0.90	1.01	0.50	0.56
Oneway	9	0.43	0.57	0.04	0.05
Disk	18	0.25	0.29	0.04	0.05
Cultivator	10	0.23	0.33	0.03	0.03
Disk, double	4	0.21	0.23	0.01	0.01
Disk, single	6	0.16	0.19	0.01	0.01
			Sub-total	0.63	0.71
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	16	0.46	0.52	0.07	0.03
Disk	21	0.25	0.29	0.05	0.06
Cultivator	93	0.31	0.36	0.29	0.33
Disk, double	16	0.23	0.26	0.04	0.04
Harrow, drag	148	0.12	0.14	0.18	0.21
			Sub-total	0.63	0.72
<u>Seeding</u>					
Drill	89	0.27	0.35	0.24	0.31
Disk	13	0.28	0.34	0.04	0.04
			Sub-total	0.28	0.35
<u>Post-seeding</u>					
Harrow, drag	179	0.11	0.13	0.20	0.23
Pack	2	0.17	0.20	0.01	0.01
Spray	28	0.12	0.17	0.03	0.05
			Sub-total	0.24	0.29
<u>Harvest</u>					
Swath	86	0.23	0.27	0.20	0.23
Combine	81	0.49	0.58	0.40	0.47
Handle grain	81	0.54	0.54	0.44	0.44
Binder	14	0.62	1.04	0.09	0.14
Stook	13	-	0.96	-	0.12
Thresher	2	0.39	2.74	0.01	0.05
Haul and cut	16	0.26	2.91	0.04	0.47
Bale	7	0.42	0.69	0.03	0.05
			Sub-total	1.21	1.97
Miscellaneous					.94
Total				2.99	4.98

Table 17.- Oats Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 38 Farms, (401 Acres of Cropland and Over) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	Percentage of total acres done	Machine-		Man-hours	
		hours per once over	per once over	hours for total acreage	for total acreage
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	43	0.70	0.77	0.30	0.33
Oneway	9	0.27	0.30	0.02	0.03
Disk	33	0.37	0.42	0.12	0.14
Cultivator	14	0.19	0.21	0.03	0.03
Disk, double	-	-	-	-	-
Disk, single	-	-	-	-	-
			Sub-total	0.47	0.53
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	-	-	-	-	-
Disk	47	0.20	0.22	0.09	0.10
Cultivator	49	0.22	0.25	0.11	0.12
Disk, double	-	-	-	-	-
Harrow, drag	106	0.09	0.10	0.10	0.11
			Sub-total	0.30	0.33
<u>Seeding</u>					
Drill	73	0.22	0.27	0.16	0.20
Disk	27	0.23	0.27	0.06	0.07
			Sub-total	0.22	0.27
<u>Post-seeding</u>					
Harrow, drag	174	0.08	0.09	0.14	0.16
Pack	2	0.20	0.22	0.01	0.01
Spray	36	0.09	0.12	0.03	0.04
			Sub-total	0.18	0.21
<u>Harvest</u>					
Swath	97	0.21	0.23	0.20	0.22
Combine	95	0.34	0.39	0.32	0.37
Handle grain	95	0.38	0.40	0.36	0.38
Binder	3	0.52	0.69	0.02	0.02
Stook	3	-	0.87	-	0.03
Thresher	-	-	-	-	-
Haul and cut	5	0.21	2.91	0.01	0.14
Bale	5	0.33	0.64	0.02	0.03
			Sub-total	0.93	1.19
Miscellaneous					0.65
Total				2.10	3.18

Table 13.- Barley Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 18 Farms (50-120 Acres of Cropland) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: of total : : acres done : - per cent -	: Machine- : : hours per : : once : : over		: Machine- : : hours for : : total : : acreage	
		: Man-hours : : per once : : over		: Man-hours : : total : : acreage	
		- hours -			
<u>Fall, 1951</u>					
Plow	79	1.13	1.33	0.93	1.05
Oneway	10	0.46	0.52	0.05	0.05
Disk	7	0.34	0.37	0.02	0.02
Cultivator	25	0.40	0.43	0.10	0.12
Disk, double	-	-	-	-	-
Disk, single	-	-	-	-	-
			Sub-total	1.10	1.24
<u>Spring, 1952</u>					
Plow	1	1.00	1.10	0.01	0.01
Oneway	4	0.62	0.69	0.02	0.03
Disk	17	0.34	0.38	0.06	0.06
Cultivator	111	0.46	0.53	0.51	0.59
Disk, double	-	-	-	-	-
Harrow, drag	196	0.14	0.17	0.27	0.33
			Sub-total	0.87	1.02
<u>Seed, 1952</u>					
Drill	103	0.31	0.40	0.32	0.41
Disk	6	0.34	0.37	0.02	0.02
			Sub-total	0.34	0.43
<u>Post-seed, 1952</u>					
Harrow, drag	100	0.15	0.17	0.15	0.17
Packer	42	0.21	0.25	0.09	0.10
Spray	16	0.17	0.27	0.03	0.04
			Sub-total	0.27	0.31
<u>Harvest, 1952</u>					
Swath	100	0.26	0.30	0.26	0.30
Combine	100	0.46	0.57	0.46	0.57
Handle grain	100	0.46	0.46	0.46	0.46
			Sub-total	1.18	1.33
Miscellaneous					0.91
Total				3.76	5.24

Table 19.- Barley Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 86 Farms (121-400 Acres of Cropland) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:	:	:	:	:
	Percentage of total	Machine-hours per acre	Machine-hours per acre	Machine-hours per acre	Man-hours per acre
	: acres done	: once over	: per once over	: total acreage	: total acreage
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	59	0.94	1.04	0.55	0.61
Oneway	8	0.46	0.51	0.04	0.04
Disk	7	0.30	0.34	0.02	0.02
Cultivator	14	0.33	0.30	0.05	0.05
Disk, double	3	0.26	0.29	0.01	0.01
Disk, single	7	0.18	0.21	0.01	0.01
			Sub-total	0.68	0.74
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	6	0.45	0.49	0.03	0.03
Disk	14	0.26	0.30	0.04	0.04
Cultivator	105	0.32	0.37	0.34	0.39
Disk, double	6	0.24	0.27	0.01	0.02
Harrow, drag	166	0.12	0.13	0.20	0.22
			Sub-total	0.62	0.70
<u>Seed, 1952</u>					
Drill	94	0.25	0.32	0.24	0.30
Disk	7	0.24	0.28	0.02	0.02
			Sub-total	0.26	0.32
<u>Post-seed, 1952</u>					
Harrow, drag	166	0.10	0.12	0.17	0.20
Packer	-	-	-	-	-
Spray	29	0.09	0.13	0.03	0.04
			Sub-total	0.20	0.24
<u>Harvest, 1952</u>					
Swath	100	0.23	0.26	0.23	0.26
Combine	100	0.46	0.54	0.46	0.54
Handle grain	100	0.54	0.54	0.54	0.54
			Sub-total	1.23	1.34
Miscellaneous					0.97
Total				2.99	4.31

Table 20.- Barley Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 43 Farms (401 Acres of Cropland and Over) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: Machine- :		: Machine- : Man-hours		
	:Percentage:hours per:		:Man-hours:hours for:		
	:in total : once	:per once :	total :	total	
	:acres done: over	: over	: acreage :	acreage	
	- per cent -	- hours -			
<u>Fall, 1951</u>					
Plow	51	0.67	0.74	0.34	0.38
Oneway	12	0.30	0.34	0.04	0.04
Disk	23	0.19	0.22	0.04	0.05
Cultivator	14	0.20	0.23	0.03	0.03
Disk, double	-	-	-	-	-
Disk, single	-	-	-	-	-
			Sub-total	0.45	0.50
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	1	0.32	0.34	0.01	0.01
Disk	34	0.20	0.23	0.07	0.08
Cultivator	65	0.24	0.27	0.16	0.18
Disk, double	6	0.23	0.26	0.01	0.02
Harrow, drag	156	0.08	0.10	0.12	0.16
			Sub-total	0.37	0.45
<u>Seeding, 1952</u>					
Drill	68	0.21	0.25	0.14	0.17
Disk	38	0.20	0.24	0.08	0.09
			Sub-total	0.22	0.26
<u>Post-seed, 1952</u>					
Harrow, drag	172	0.08	0.09	0.14	0.15
Packer	2	0.21	0.24	0.01	0.01
Spray	52	0.09	0.12	0.05	0.06
			Sub-total	0.20	0.22
<u>Harvest, 1952</u>					
Swath	100	0.20	0.22	0.20	0.22
Combine	100	0.34	0.39	0.34	0.39
Handle grain	100	0.40	0.40	0.40	0.40
			Sub-total	0.94	1.01
Miscellaneous					0.65
Total				2.18	3.09

Table 21.- Flax Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 17 Farms (50-120 Cropland Acres) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: of total : acres done :	: Machine- : hours per : once over :	: Machine- : hours per : once over :	: Man-hours : total : acreage :	: Man-hours : total : acreage :
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	78	1.13	1.24	0.88	0.97
Oneway	19	0.68	0.75	0.13	0.14
Disk	-	-	-	-	-
Cultivator	23	0.41	0.46	0.09	0.10
Disk, double	-	-	-	-	-
Disk, single	4	0.15	0.18	0.01	0.01
			Sub-total	1.11	1.22
<u>Spring, 1952</u>					
Plow	11	0.47	0.53	0.05	0.06
Oneway	18	0.72	0.83	0.13	0.15
Disk	26	0.34	0.39	0.09	0.10
Cultivator	160	0.40	0.45	0.64	0.72
Disk, double	6	0.39	0.44	0.02	0.03
Harrow, drag	259	0.15	0.17	0.39	0.44
			Sub-total	1.32	1.50
<u>Seeding</u>					
Drill	121	0.38	0.51	0.46	0.62
Disk	-	-	-	-	-
			Sub-total	0.46	0.62
<u>Post-seed</u>					
Harrow, drag	51	0.16	0.20	0.08	0.10
Packer	14	0.20	0.25	0.03	0.04
Spray	7	0.20	0.30	0.01	0.02
			Sub-total	0.12	0.16
<u>Harvest</u>					
Swath	100	0.27	0.32	0.27	0.32
Combine	100	0.46	0.55	0.46	0.55
Handle grain	100	0.46	0.46	0.46	0.46
			Sub-total	1.19	1.33
Miscellaneous					0.89
Total				4.20	5.72

Table 22.- Flax Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 49 Farms, (121-400 Acres of Cropland) Morris and Rhineland Municipalities, 1952

		Average time per acre			
		: Machine-	: Machine-	: Man-hours	
		: Percentage:hours per:	: Man-hours:hours for :	: for	
Season and	: of total :	once :	per once :	total :	total
operation	: acres done:	over :	over :	acreage :	acreage
		- per cent -	- hours -		
Fall, 1951					
Plow	52	0.84	0.94	0.43	0.49
Oneway	15	0.45	0.52	0.07	0.08
Disk	17	0.25	0.29	0.04	0.05
Cultivator	20	0.34	0.40	0.07	0.08
Disk, double	5	0.29	0.32	0.01	0.02
Disk, single	5	0.18	0.22	0.01	0.01
			Sub-total	0.63	0.73
Spring, 1952					
Plow	9	0.64	0.83	0.06	0.07
Oneway	13	0.46	0.52	0.06	0.07
Disk	44	0.24	0.28	0.10	0.12
Cultivator	113	0.27	0.34	0.30	0.38
Disk, double	16	0.27	0.30	0.04	0.05
Harrow, drag	208	0.11	0.13	0.23	0.27
			Sub-total	0.79	0.96
Seeding					
Drill	92	0.25	0.32	0.23	0.29
Disk	12	0.33	0.40	0.04	0.05
			Sub-total	0.27	0.34
Post-seed					
Harrow, drag	114	0.10	0.12	0.11	0.14
Packer	2	0.22	0.28	0.01	0.01
Spray	33	0.10	0.13	0.03	0.04
			Sub-total	0.15	0.19
Harvest					
Swath	100	0.23	0.26	0.23	0.26
Combine	100	0.47	0.59	0.47	0.59
Handle grain	100	0.46	0.46	0.46	0.46
			Sub-total	1.16	1.31
Miscellaneous				0.98	
Total				3.00	4.51

Table 23.- Flax Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 33 Farms, (401 Acres of Cropland and Over) Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:	:	:	:	:
	Percentage of total	Machine-hours per once	Machine-hours per once	Machine-hours per once	Man-hours per once
	: acres done	: over	: over	: acreage	: acreage
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	33	0.74	0.31	0.24	0.27
Oneway	14	0.31	0.36	0.04	0.05
Disk	51	0.20	0.23	0.10	0.12
Cultivator	16	0.24	0.29	0.04	0.05
Disk, double	-	-	-	-	-
Disk, single	-	-	-	-	-
			Sub-total	0.42	0.49
<u>Spring, 1952</u>					
Plow	3	0.93	1.01	0.03	0.03
Oneway	4	0.47	0.52	0.02	0.02
Disk	38	0.19	0.22	0.07	0.03
Cultivator	158	0.22	0.25	0.35	0.40
Disk, double	6	0.20	0.22	0.01	0.01
Harrow, drag	190	0.03	0.10	0.15	0.19
			Sub-total	0.63	0.73
<u>Seeding</u>					
Drill	91	0.22	0.28	0.20	0.25
Disk	14	0.20	0.26	0.03	0.04
			Sub-total	0.23	0.29
<u>Post-seed</u>					
Harrow, drag	103	0.08	0.09	0.08	0.09
Packer	11	0.19	0.22	0.02	0.02
Spray	58	0.09	0.15	0.05	0.09
			Sub-total	0.15	0.20
<u>Harvest</u>					
Swath	100	0.20	0.22	0.20	0.22
Combine	100	0.31	0.37	0.31	0.37
Handle grain	100	0.33	0.33	0.33	0.33
			Sub-total	0.84	0.92
Miscellaneous					0.70
Total				2.27	3.33

Table 24.- Buckwheat Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre According to Season and Operation, 16 Farms, Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:	:	:	:	:
	:Percentage:	:Machine-	:Machine-	:Man-hours	
	: of total :per once:per once :for total: total	: acres done: over : over : acreage : acreage			
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	33	0.83	0.96	0.27	0.32
Oneway	19	0.53	0.62	0.11	0.12
Disk	19	0.36	0.40	0.07	0.08
Cultivator	-	-	-	-	-
Disk, double	3	0.29	0.32	0.01	0.01
Disk, single	13	0.13	0.17	0.02	0.02
			Sub-total	0.48	0.55
<u>Spring, 1952</u>					
Plow	6	1.00	1.10	0.06	0.07
Oneway	47	0.49	0.54	0.23	0.25
Disk	19	0.33	0.37	0.06	0.07
Cultivator	165	0.37	0.42	0.61	0.69
Disk, double	3	0.23	0.27	0.01	0.01
Harrow, drag	243	0.12	0.15	0.29	0.36
			Sub-total	1.26	1.45
<u>Seeding</u>					
Drill	95	0.27	0.38	0.26	0.36
Disk	10	0.29	0.39	0.03	0.04
			Sub-total	0.29	0.40
<u>Post-seed</u>					
Harrow, drag	92	0.12	0.15	0.11	0.14
Packer	3	0.27	0.32	0.01	0.01
Spray	1	0.20	0.60	-	0.01
			Sub-total	0.12	0.16
<u>Harvest</u>					
Swath	100	0.24	0.28	0.24	0.28
Combine	100	0.43	0.56	0.48	0.56
Handle grain	100	0.50	0.50	0.50	0.50
			Sub-total	1.22	1.34
Miscellaneous					0.85
Total				3.37	4.75



A promising field of sugar beets. The level topography is characteristic of the Red River Valley.



Loading sugar beets for shipment to the refinery at Winnipeg.

Table 25.- Sugar Beets Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 37 Farms, Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: Machine- :		: Machine- :		: Man-hours
	: Percentage :	hours per :	Man-hours :	hours for :	for
	: of total :	once :	per once :	total :	total
	: acres done :	over :	over :	acreage :	acreage
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	61	0.87	0.96	0.53	0.53
Oneway	2	0.33	0.44	0.01	0.01
Cultivator	73	0.23	0.34	0.22	0.26
Disk, double	2	0.40	0.50	0.01	0.01
Harrow, drag	29	0.19	0.24	0.06	0.07
			Sub-total	0.83	0.93
<u>Spring, 1952</u>					
Plow	7	1.07	1.28	0.07	0.09
Oneway	2	0.79	0.34	0.02	0.02
Disk	9	0.26	0.29	0.02	0.03
Cultivator	156	0.25	0.30	0.39	0.47
Disk, double	3	0.39	0.49	0.01	0.01
Harrow, drag	360	0.11	0.14	0.40	0.50
Pack	39	0.27	0.31	0.10	0.12
			Sub-total	1.01	1.24
<u>Seeding, 1952</u>					
Drill	178	0.46	0.59	0.32	1.05
			Sub-total	0.82	1.05
<u>Post-seed, 1952</u>					
Cultivator	334	0.64	0.71	2.14	2.37
Packer	10	0.24	0.28	0.02	0.03
Spray	43	0.17	0.20	0.07	0.09
Weed and thin	147	-	16.66	-	24.49
Harrow, drag	6	0.14	0.20	0.01	0.01
			Sub-total	2.24	26.99
<u>Harvest, 1952</u>					
Harvester	58	2.10	4.90	1.22	2.84
Loader	32	1.43	6.94	0.46	2.22
Lifter	42	1.54	2.13	0.65	0.89
Topping (mach.)	6	0.73	0.83	0.05	0.05
Topping (hand)	25	-	26.08	-	6.52
Haul	100	0.93	4.34	0.98	4.34
Other	-	-	-	0.07	0.64
			Sub-total	3.43	17.50
Miscellaneous				0.35	
Total				8.33	48.56

Table 26.- Sunflowers Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 10 Farms, Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	:Percentage of total : acres done:	:Machine- : hours once : over	:Machine- : Man-hours per once : over	:Machine- : hours total : acreage	:Man-hours : total : acreage
	- per cent -		- hours -		
<u>Fall, 1951</u>					
Plow	43	0.86	0.96	0.37	0.41
Oneway	-	-	-	-	-
Disk	54	0.26	0.29	0.14	0.16
Cultivator	7	0.35	0.38	0.02	0.03
Disk, double	4	0.30	0.35	0.01	0.01
Harrow, drag	9	0.10	0.12	0.01	0.01
			Sub-total	0.55	0.62
<u>Spring, 1952</u>					
Plow	-	-	-	-	-
Oneway	-	-	-	-	-
Disk	55	0.28	0.31	0.15	0.17
Cultivator	85	0.26	0.30	0.22	0.26
Disk, double	4	0.30	0.40	0.01	0.02
Harrow, drag	148	0.10	0.12	0.15	0.18
			Sub-total	0.53	0.63
<u>Seeding</u>					
Drill	114	0.30	0.40	0.34	0.46
			Sub-total	0.34	0.46
<u>Post-seed</u>					
Harrow, drag	120	0.10	0.12	0.12	0.14
Cultivator	89	0.49	0.55	0.44	0.49
Weeding	7	-	15.00	-	1.05
			Sub-total	0.56	1.68
<u>Harvest</u>					
Swath	-	-	-	-	-
Combine	71	0.31	0.37	0.22	0.26
Handle grain	71	0.33	0.33	0.23	0.23
Mow and rake	29	1.07	1.07	0.31	0.31
Bale	29	0.23	0.23	0.07	0.07
Haul fodder	29	-	2.38	-	0.69
			Sub-total	0.83	1.56
Miscellaneous					0.85
Total				2.81	5.80

Table 27.- Corn Produced on Stubble Land: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Machine, 21 Farms, Morris and Rhineland Municipalities, 1952

Season and operation	Average time per acre				
	: Machine-:		: Machine- : Man-hours		
	:Percentage: hours		:Man-hours:hours for:		
	: of total	:per once:	:per once :	total	total
	:acres done:	over :	over :	acreage :	acreage
	- per cent		- hours -		
<u>Fall, 1951</u>					
Plow	75	0.71	0.79	0.53	0.59
Oneway	1	0.40	0.45	0.01	0.01
Disk	15	0.19	0.23	0.03	0.03
Harrow, drag	42	0.07	0.08	0.03	0.03
			Sub-total	0.60	0.66
<u>Spring, 1952</u>					
Plow	4	1.18	1.32	0.05	0.05
Oneway	1	0.70	0.80	0.01	0.01
Disk	48	0.13	0.21	0.09	0.10
Cultivator	93	0.38	0.45	0.35	0.42
Harrow, drag	107	0.13	0.17	0.14	0.13
			Sub-total	0.64	0.76
<u>Seeding</u>					
Drill, grain	60	0.24	0.29	0.14	0.17
Drill, corn	40	0.59	0.34	0.24	0.34
			Sub-total	0.38	0.51
<u>Post-seed</u>					
Harrow, drag	175	0.11	0.13	0.19	0.23
Pack	5	0.67	0.73	0.03	0.04
Cultivator	260	0.45	0.50	1.17	1.30
Weeding	61	-	3.29	-	2.01
			Sub-total	1.39	3.58
<u>Harvest</u>					
Swath	2	0.33	0.50	0.01	0.01
Binder	22	1.17	1.82	0.26	0.40
Stook	7	-	3.95	-	0.23
Picker, machine	76	0.53	0.53	0.40	0.44
Pick, hand	10	-	16.00	-	1.60
Sheller	63	0.54	1.17	0.37	0.30
Bale	2	0.67	0.83	0.01	0.02
Haul	40	0.42	1.36	0.17	0.54
			Sub-total	1.22	4.09
Miscellaneous					1.04
Total				4.23	10.64

Table 28.- Summerfallow Operations: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 25 Farms, 50-120 Cropland Acres, Morris and Rhineland Municipalities, 1951

Season and operation	Average time per acre				
	:	:	:	:	:
	: Machine-		: Machine-		: Man-hours
	: Percentage of total : acres done	: hours per once over	: Man-hours per once over	: hours for total acreage	: for total acreage
	- per cent -		- hours -		
<u>Fall, 1950</u>					
Plow	11	1.20	1.40	0.13	0.15
Oneway	37	0.58	0.65	0.21	0.24
Disk	19	0.35	0.39	0.07	0.07
Cultivator	-	-	-	-	-
Disk, double	-	-	-	-	-
Disk, single	8	0.17	0.23	0.01	0.02
Harrow, drag	-	-	-	-	-
			Sub-total	0.42	0.48
<u>Summer, 1951</u>					
Plow	42	1.22	1.31	0.51	0.55
Oneway	23	0.74	0.81	0.17	0.19
Disk	31	0.33	0.37	0.10	0.11
Cultivator	316	0.36	0.42	1.14	1.33
Disk, double	-	-	-	-	-
Disk, single	11	0.16	0.24	0.02	0.03
Harrow, drag	240	0.11	0.14	0.26	0.34
Rod weeder	-	-	-	-	-
			Sub-total	2.20	2.55
Miscellaneous ¹					0.55
Total				2.62	3.58

¹ Includes machinery repairs.

Table 29.- Summerfallow Operations: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 85 Farms, (121-400 Acres of Cropland), Morris and Rhineland Municipalities, 1951

Season and operation	Average time per acre				
	:	:	:	:	:
	:	:Machine-	:	:Machine-	:Man-hours
	:Percentage:	hours	:Man-hours:	hours	: for
	: of total	:per once:	per once	:for total:	total
	:acres done:	over	: over	:acreage	: acreage
	- per cent -		- hours -		
<u>Fall, 1950</u>					
Plow	13	0.82	0.92	0.11	0.12
Oneway	15	0.50	0.57	0.08	0.08
Disk	7	0.25	0.30	0.02	0.02
Cultivator	10	0.35	0.38	0.04	0.04
Disk, double	6	0.30	0.33	0.02	0.02
Disk, single	13	0.14	0.17	0.02	0.02
Harrow, drag	-	-	-	-	-
			Sub-total	0.29	0.30
<u>Summer, 1951</u>					
Plow	54	0.95	1.07	0.51	0.58
Oneway	27	0.47	0.53	0.13	0.14
Disk	32	0.26	0.28	0.08	0.09
Cultivator	261	0.38	0.44	0.99	1.15
Disk, double	9	0.29	0.36	0.03	0.03
Disk, single	15	0.19	0.22	0.03	0.03
Harrow, drag	183	0.12	0.14	0.22	0.26
Rod weeder	1	0.16	0.18	-	-
			Sub-total	1.99	2.28
Miscellaneous					0.50
Total				2.28	3.08

Table 30.- Summerfallow Operations: Machine-Hour and Man-Hour Requirement per Acre, According to Season and Operation, 45 Farms, (401 Acres of Cropland and Over), Morris and Rhineland Municipalities, 1951

Season and operation	Average time per acre				
	:	:	:	:	:
	: Machine-:		: Machine-:		: Man-hours
	: Percentage:	hours	: Man-hours:	hours	: for
	: of total	:per once:	:per once:	:for total:	total
	: acres done:	over	: over	: acreage	: acreage
	- per cent -		- hours -		
<u>Fall, 1950</u>					
Plow	7	0.73	0.83	0.05	0.06
Oneway	9	0.36	0.39	0.03	0.04
Disk	20	0.20	0.22	0.04	0.04
Cultivator	11	0.22	0.25	0.02	0.03
Disk, double	5	0.17	0.29	0.01	0.01
Disk, single	8	0.13	0.16	0.01	0.01
Harrow, drag	1	0.08	0.10	-	-
			Sub-total	0.16	0.19
<u>Summer, 1951</u>					
Plow	31	0.72	0.79	0.22	0.24
Oneway	35	0.34	0.38	0.12	0.13
Disk	94	0.20	0.23	0.19	0.22
Cultivator	248	0.25	0.28	0.62	0.69
Disk, double	5	0.33	0.36	0.02	0.02
Disk, single	20	0.12	0.14	0.02	0.03
Harrow, drag	114	0.09	0.10	0.10	0.11
Rod weeder	-	-	-	-	-
			Sub-total	1.29	1.44
Miscellaneous					0.30
Total				1.45	1.93

Table 31.- Man-Hour Requirement per Acre for Overhead Tasks of Crop Production¹ According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1952

Size of farm	Task		
	Seed	Marketing	Repairing
	preparation	grain	machinery
	- hours per acre -	- acreage in crop -	- hours per acre (total acreage) -
50 - 120 acres	0.24	0.21	0.54
121 - 400 acres	0.21	0.25	0.48
401 acres and over	0.21	0.17	0.27
All farms	0.22	0.20	0.43

¹ Time required for overhead tasks is included in tables 12 to 30 for the various crops and summerfallow in "Miscellaneous".

Factors Affecting Labor Requirements

Many factors determine the amount of time required per acre for crop production. Weather is probably the most important factor causing variations from year to year; its influence, however, is generally uniform over a given area. There are factors associated with the management of the farm which cause variations within an area from farm to farm. Some of the major management factors are: size of fields; size of tillage, seeding, and harvesting machines; intensity of cultivation; and crop yields.

Weather

The amount of time required per acre for field operations varies from year to year depending primarily on the speed at which the individual operations are performed. Weather is one of the most important factors influencing the speed of field operations. No figures are available which might be used as criteria to measure the relationship between weather conditions and time per acre required for crop production. However, the operators interviewed stated that during the year of the survey the weather was generally favorable for working in the field during the seeding, summer and harvest seasons.

Seeding started around April 17 or seven to ten days earlier than the usual date. Most of the seeding was finished by June 1 although flax and buckwheat were sown on a few farms up to June 15. Lack of moisture and delayed seeding pending the germination and cultivation of weeds were the main reasons for the long seeding period. Because of dry field conditions, however, the actual amount of time expended on all field operations during the seeding season was relatively low.

Grain harvesting started around August 1 and finished around September 15. Sunflowers, which are harvested after a frost, were combined around October 15; on most of the farms this operation required from one to two days. Weather and soil conditions were particularly favorable for harvesting sugar beets. The lifting and hauling of this crop started around October 3 and was finished around October 10.

Size of Field

Size of field is an important factor influencing the labor time required for field operations. As the fields decrease in size there is an increase in the proportional amount of time required for turning, finishing corners, and moving from plot to plot.

Table 32.- Man-Hours per Acre Required for Wheat, Oats, Barley and Flax ¹ According to Size of Farm and Size of Field, 143 Farms, ² Morris and Rhineland Municipalities, 1952

Size of farm and size of field	: Crop			
	:Wheat	: Oats	: Barley	: Flax
	- hours -			

Farms with 50-120 acres of cropland

Field size:

13 acres and under	4.56	5.46	4.92	5.38
14-19 acres	4.50	7.05	5.55	6.48
20 acres and over	3.44	5.49	5.06	6.33

Farms with 121-400 acres of cropland

Field size:

19 acres and under	4.67	5.49	5.15	4.78
20-35 acres	3.39	4.64	4.62	4.19
36 acres and over	3.51	3.79	3.22	3.25

Farms with 401 acres of cropland and over

Field size:

41 acres and under	3.03	3.20	3.15	3.36
42-59 acres	2.89	3.31	3.32	2.95
60 acres and over	2.73	2.50	2.64	3.10

¹ Part of the acreage of these crops was on land which had been cropped the previous year and part was on summerfallow.

² Twelve farms were omitted because of incomplete information.

To determine the effect of size of field on labour requirements the records were sorted according to size of farm and sub-

sorted according to size of field. For all farms the average size of field was 35 acres and ranged from an average of 15 acres per field on farms with less than 121 acres of cropland to 59 acres per field on farms with 401 or more acres of cropland.

The effect that size of field had on crop labor requirements is illustrated in Table 32. On the medium and large farm size-groups there was a general decrease in time requirement per acre for wheat, oats, barley and flax as size of field increased. On the small farm size-group there was a decrease in time requirement for wheat as size of field increased; but for oats, barley and flax there was no significant relationship.

Size of Machine

The working capacity of each machine is directly related to its width. Except for self-propelled and auxiliary-motor combines, the width of each machine is limited by the power of the farm tractor. Therefore, size of tractor may be used as a measure for the aggregate size of field machines. When the records were sorted according to size of tractor within each farm size-group, it was found that with an increase in size of machines there was a marked decrease in labour time required per acre for wheat, oats, barley and flax (Table 33).

Table 33.- Man-Hours per Acre Required for Wheat, Oats, Barley and Flax According to Size of Farm and Tractor, 143 Farms, Morris and Rhineland Municipalities, 1952

	: <u>Crop</u>			
<u>Size of farm and tractor</u>	<u>:Wheat</u>	<u>: Oats:</u>	<u>Barley :</u>	<u>Flax.</u>
	- hours -			
<u>Farms with 50-120 acres of cropland</u>				
2-plow tractor and smaller	5.19	6.32	5.56	6.06
2-3 plow tractor and larger	3.52	5.17	4.95	5.34
<u>Farms with 121-400 acres of cropland</u>				
2-3 plow tractor and smaller	3.93	5.50	4.66	4.58
3-plow tractor and larger	3.47	4.49	3.88	4.19
<u>Farms with 401 acres of cropland and</u> <u>over</u>				
3-plow tractor and smaller	2.65	3.34	3.40	3.66
3-4 plow tractor and larger	2.91	3.02	2.97	3.18

It will be noted that on the large farms less labor time was required per acre for crop production than on the medium size farms even when both had tractors of equal power. As already stated, many of the large farms had two or more tractors. Where

there was more than one tractor, each one would generally be used for specific operations in which case less time would be lost in changing from one operation to another.

Intensity of Cultivation.

Examination of the records showed that as size of farm increased there was a slight decrease in the amount of tillage work done per acre. To prepare the land for seeding wheat on farms with less than 121 acres of cropland, 58 per cent of the total wheat acreage was plowed; three per cent onewayed; six per cent diskered; 93 per cent cultivated; 170 per cent drag-harrowed; and 45 per cent was disk-harrowed. On farms with 401 or more acres of cropland, 58 per cent of the total wheat acreage was plowed; 18 per cent onewayed; 39 per cent diskered; 32 per cent cultivated; 113 per cent drag-harrowed; and 17 per cent was disk-harrowed (Tables 12 and 14). For oats, barley and flax, the relationship between amount of tillage work done per acre and size of farm was generally the same as for wheat. For the tillage of summerfallow there was also more tillage work done per acre on the small than on the large farms.

Crop Yields

The labor time required for harvesting the various crops is influenced by the yield. When considering that the small farms required more time per acre for grain crop production than the large farms, it is significant to note that the small farms had higher yields for wheat, oats, barley and flax (Table 34).

Table 34.- Crop Yield per Acre for Wheat, Oats, Barley and Flax According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1952

Size of farm	: Crop			
	:Wheat	: Oats	: Barley	: Flax .
	- bushels -			
50-120 acres of cropland	20.0	47.9	33.0	8.2
121-400 acres of cropland	18.6	44.8	27.4	8.6
401 or more acres of cropland	18.7	36.2	25.8	8.0
All farms	18.7	40.4	26.8	8.0
Average yield 1934-53 ¹	19.7	32.2	24.3	8.6

¹ Source: Average yields for Grain crops in Manitoba Crop District 3. *Report on Crops and Livestock, etc.*, The Department of Agriculture and Immigration, Province of Manitoba, 1934-53.

No attempt has been made in this study to relate the various factors which influence crop yields to time required per acre for

crop production. However, as previously noted, more intensive cultivation was done on the small than on the large farms. Also, a wider variety of crops was grown on the small farms. It might be suggested that the operators of small farms were able to select a more suitable crop for a specific plot.

Relatively intensive cultivation, a small acreage in each crop, and higher crop yields, all of which are more commonly found on the small farms, tend to increase the labor requirement per acre for crop production.

LABOR USE IN LIVESTOCK PRODUCTION

Labor Requirements

The amount of time required to care for livestock is influenced by management practices and the organization of the livestock enterprise. A dairy cattle enterprise normally requires more labor than a beef cattle enterprise. Also, the use of sheds, loafing barns and self-feeders are all labor-saving innovations in cattle production. Likewise, a modern poultry house with a concrete floor, droppings table and roosts, self-feeder and water stand will greatly reduce the amount of labor required for poultry production.

In the survey area natural shelter is inadequate to provide protection for horses and cattle to run out during the winter months and so all livestock was housed during this period. Many of the cattle were of mixed dairy and beef breeding and cows were milked on nearly all farms. Most of the cattle were tied in the conventional type barn. There were a few separate hog houses. There were many modern poultry houses in the area but on many farms the poultry was kept in part of the main barn.

Kind of Livestock

The hours of labor required per animal unit to care for the different kinds of livestock are given in Table 35. For all farms, horses required an average of 78.3 hours of labor per animal unit; cattle, hogs and poultry required 212.4, 137.4 and 258.3 hours of labor per animal unit respectively.

Table 35.- Labor Requirements per Animal Unit ¹ for Various Kinds of Livestock According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1951-52

Size of farm	: Kind of livestock			
	: Horses	: Cattle	: Hogs	: Poultry
	- hours -			
50-120 acres	101.0	231.8	161.2	320.0
121-240 acres	77.0	229.2	161.2	241.0
241-400 acres	80.8	217.0	157.0	321.2
401-560 acres	105.6	210.5	109.5	197.8
561 acres and over	69.3	173.4	105.6	209.5
All farms	78.3	212.4	137.4	258.3

¹ An animal unit represents one mature horse or cow, 1.4 steers or heifers, three calves, three sows or five other market weight hogs, or 100 mature poultry.

The labor requirement rate for different kinds of livestock, as indicated in this study, is high compared with results of other similar studies.¹ However, on most of the farms visited the livestock enterprise was small; often just enough cattle, hogs and poultry were kept to supply the family with livestock produce. Also a large part of the work on livestock was done by elderly operators, and operators' teen-age children, all of whom had little, if any, alternative use for their labor. Labor contributed by the various members of the family labor force on livestock production is illustrated in Table 36.

Table 36.- Percentage Distribution of Time Spent on the Various Kinds of Livestock According to Class of Worker, 143 Farms, Morris and Rhineland Municipalities, 1951-52

Class of worker	: Kind of livestock :				All
	:Horses :	Cattle :	Hogs :	Poultry :	Livestock
	- per cent -				
Operator	71	55	65	59	58
Full time family	26	20	23	20	21
Other family	1	19	8	19	17
Hired	2	6	4	2	4
Total	100	100	100	100	100
All workers (total hours)	94	892	261	465	1,712

Seasonal Requirement

Labor required for the different kinds of livestock according to season is shown in Table 37. For all farms an average of 1,712 hours of labor per farm was used on livestock production.

Table 37.- Hours of Labor Required for the Various Kinds of Livestock According to Season, 143 Farms, Morris and Rhineland Municipalities, 1951-52

Season	: Kind of livestock :				All
	:Horses :	Cattle :	Hogs :	Poultry :	livestock
	- hours -				
October-March	75	500	132	244	951
April-May	9	125	43	87	264
June-July	6	134	43	68	251
August-September	4	133	43	66	246
All year	94	892	261	465	1,712

¹ For comparison see Hare, H. R., Farm Business Management, The Ryerson Press, Toronto, May, 1940, p. 118.



On most of the farms there is a small herd of either dual purpose cattle of mixed breeding or beef cattle.



Coulees provide local drainage as well as drinking water for livestock. Coulee banks provide pasture and hay.

For the most part horses worked in the winter and ran in the pasture during the summer. About 80 per cent of the total labor hours on horses was used during the winter months.

A little over one-half of the total labor hours on cattle was used during the winter months. In the winter additional labor was required for cleaning barns and hauling feed.

Slightly less than one-half of the total labor hours on hogs and poultry was used during the winter months. In the summer there was additional labor required to care for sows at farrowing time and to raise chickens.

Factors Affecting Labor Requirements

Size of Farms

There was a general decrease in hours of labor required per animal unit for the various kinds of livestock as size of farm increased (Table 35). However, when considering size of farm as a factor which influences the amount of labor required for livestock production, it is important to note that the large farms generally had more of the different kinds of livestock than the small farms. In this regard it might be expected that the factor most responsible for increased labor efficiency on the larger farms would be the size of enterprise rather than the number of acres.

Size of Enterprise

The effect that size of herd had on the amount of labor required in cattle production is illustrated in Table 38. As size of herd increased there was a marked decrease in the amount of labor required per animal unit. On farms with less than 2.0 cattle animal units an average of 355.7 hours of labor per animal unit was required. On farms with more than 6.5 cattle animal units an average of 162.2 hours of labor per animal unit was required. The number of cows milked and the amount of cream sold increased as size of enterprise increased. This would indicate that the management practices were generally the same on all herd size-groups.

Table 38.- Relationship Between Size of Herd and Labor Required for Cattle Production, 134 Farms ¹, Morris and Rhineland Municipalities, 1951-52

Size of herd	:Average: : size : of herd	: Milk : cows	: Cropland : acres	: Cream : sold	:Hours of labor : per animal : unit
	- A.U's -	- acres -	- gals.-	- hours -	
0-1.9 A.U's	1.5	1.1	241	14	355.7
2.0-3.5 A.U's	2.8	1.9	244	46	252.7
3.6-4.9 A.U's	4.1	2.9	298	108	231.7
5.0-6.5 A.U's	5.7	3.6	442	170	191.4
6.6 A.U's and over	9.1	5.2	467	201	162.2

¹ Nine farms omitted because of incomplete information or absence of cattle.

As the size of the poultry flock increased there was a decrease in the amount of labor required per animal unit (Table 39). On farms with less than 0.8 poultry animal units an average of 515.7 hours of labor per animal unit was required; on farms with more than 3.7 poultry animal units an average of 175.8 hours of labor was required per animal unit. The management practices were generally the same for all flock size-groups.

Table 39.- Relationship between Size of Flock and Labor Required for Poultry Production, 128 Farms ¹, Morris and Rhineland Municipalities, 1951-52

Size of flock	:Average : : size : :of flock:	:Cropland: : acres :	: Eggs : :produced: :per year:	: Hours labor per : animal : unit
	- 100 birds -	- acres -	- doz. -	- hours -
0-0.7 A.U's	0.4	307	367	515.7
0.8-1.7 A.U's	1.2	328	1,262	332.4
1.8-2.7 A.U's	2.2	371	1,974	259.5
2.8-3.7 A.U's	3.3	281	2,660	183.8
3.8 A.U's and over	6.6	361	8,334	175.8

¹ Fifteen farms omitted because of no poultry or incomplete information.

On many farms hogs were kept only for part of the year. Also, it was seldom that more than one brood sow was kept per farm. Therefore, no attempt was made to determine the relationship between size of hog enterprise and labor requirement.

LABOR USE ON MISCELLANEOUS TASKS

Apart from operations relating to crop production and daily livestock chores there are many miscellaneous tasks pertaining to the farm business as a whole that require considerable labor. In the analysis of the data these miscellaneous tasks were grouped under farm management, farm maintenance, exchange labor and off-farm labor. The time required for all miscellaneous tasks amounted to an average of 1,410 hours per farm for all farms in the survey area, and increased from an average of 1,136 hours per farm on farms with less than 121 acres of cropland to 1,743 hours per farm on farms with 561 or more acres of cropland (Table 40)

Farm management included such tasks as keeping accounts, labor supervision, and planning of daily operations. Time required for these tasks amounted to an average of 380 hours per farm, and increased from an average of 209 hours per farm on farms with less than 121 acres of cropland to 582 hours per farm on

farms with 561 or more acres of cropland.

Table 40.- Hours of Labor Required for Miscellaneous Farm Tasks
According to Size of Farm, 143 Farms, Morris and
Rhineland Municipalities, 1951-52

Size of farm	Task					Total
	: Number:	: Farm	: Farm	: Exchange:	: Off-	
	: of	: man-	: Main-	: labour	: farm	
	: farms	: agement	: tenance:		: labor:	
- hours -						
50-120 acres	24	209	678	34	215	1,136
121-240 acres	42	309	784	51	104	1,249
241-400 acres	35	436	974	55	105	1,570
401-560 acres	22	417	928	19	68	1,432
561 acres and over	20	582	1,059	41	62	1,743
All farms	143	380	875	43	112	1,410

Farm maintenance included such tasks as going to town for supplies, erecting and repairing buildings and other improvements, gardening and caring for windbreaks, and other tasks related to the upkeep of the farm. Maintenance tasks required an average of 875 hours of labor per farm. The amount of time spent on these tasks increased as size of farm increased.

Exchange labor represented time expended by members of the family labor force on neighboring farms as a non-monetary payment for borrowed machinery, labor or other help received from neighbours. Time required for this work amounted to an average of 43 hours per farm and was unimportant on all farm size-groups.

Off-farm labor represented time spent by the family labor force on neighbouring farms for which a payment was received, and for voluntary work in agricultural and community organizations for which there was no remuneration. Time required for off-farm work averaged 112 hours per farm, and decreased from an average of 215 hours per farm on farms with less than 121 acres of cropland to 62 hours per farm on farms with 561 or more acres of cropland.

The large amount of labor used for farm management and maintenance indicates the importance of this part of the farm program. It is difficult to allot any specific amount of this labor to any individual enterprise and it must, therefore, be considered as an overall part of the labor requirements in agricultural production. Some of this labor was used in tasks that relate to beautifying the homestead and as such may be considered non-productive in a monetary sense. However, this labor is productive in terms of satisfaction to the operator and his

family and is an important factor in determining the success of the entire farm business.

The distribution of labor hours on miscellaneous tasks by the various members of the labor force is illustrated in Table 41. For the most part the operators performed the tasks related to farm management and maintenance; they also contributed the greatest number of hours expended on exchange labor and off-farm labor. Grown sons contributed much of the labor used in repairing machinery, repairing buildings and off-farm work. The operators' wives, daughters and teen-age school children contributed most of the labour used on gardening and care of windbreaks. Hired help made a small labor contribution towards farm maintenance which was mostly on repairing buildings and other farm improvements.

Table 41.— Percentage Distribution of Time Spent on Miscellaneous Farm Tasks According to Class of Worker, 143 Farms, Morris and Rhineland Municipalities, 1951-52

Class of worker	Task				Total
	Farm manage- ment	Exchange labor	Off-farm labor	Farm main- tenance	
Operator	30	72	69	56	64
Full-time family	17	14	28	14	16
Other family	2	7	1	25	16
Hired	1	7	2	5	4
Total	100	100	100	100	100
All workers (total hours)	380	43	112	875	1,410

The seasonal requirements for labor on miscellaneous tasks are summarized in Table 42. The time spent on farm management was distributed fairly evenly over the entire year; 47 per cent was used in the October-March period, 19 per cent in the April-May period, 20 per cent in the June-July, and 14 per cent in the August-September period. Only 26 per cent of the total time for farm maintenance was used in the October-March period. It was during the April-May, June-July and August-September periods that all work on gardening and windbreaks, and most of the work on repairing buildings and other improvements was done. Exchange of labor was usually made during the October-March and August-September periods. Off-farm work was most common during August and September.

Table 42.- Percentage Distribution of Time Spent on
Miscellaneous Farm Tasks According to Season, 143
Farms, Morris and Rhineland Municipalities,
1951-52

Season	Task				Total
	: Farm man- agement	: Farm main- tenance	: Exchange labor	: Off-Farm labor	
	- per cent -				
October-March	47	26	32	29	32
April-May	19	23	5	11	20
June-July	20	31	12	20	27
August-September	14	20	51	40	21
Total	100	100	100	100	100
All year (total hours)	380	875	43	112	1,410

DISTRIBUTION OF THE TOTAL LABOR HOURS TO TASK

For all farms included in the survey an average of 4,183 total hours of labor was used per farm on activities related to the farm business. As the farms increased in size there was an increase in the amount of labor required. On farms with less than 121 acres of cropland an average of 3,308 hours of labor was used per farm; on farms with 561 or more acres of cropland an average of 5,339 hours of labor was used per farm. The pattern of labor distribution among the various activities and miscellaneous farm tasks is illustrated in Table 43.

Table 43.- Percentage Distribution of the Total Time Spent on
the Various Farm Enterprises and Miscellaneous Tasks
According to Size of Farm, 143 Farms, Morris and
Rhineland Municipalities, 1951-52

Kind of enterprise or task	Size of farm (acres of cropland)					All plus: farms
	: 50-120:	: 121-240:	: 241-400:	: 401-560:	: 561 plus:	
Number of farms	24	42	35	20	22	143
	- per cent -					
Crop production	19	22	25	29	31	25
Livestock production	46	45	40	38	36	41
Farm management	6	8	10	10	11	9
Farm maintenance	21	21	22	21	20	21
Exchange labor	1	1	1	1	1	1
Off-farm labor	7	3	2	1	1	3
Total	100	100	100	100	100	100
All work (total hours)	3,308	3,791	4,414	4,386	5,339	4,183

Crop Production

Although crop production was generally the major enterprise on all farms visited, the average number of labor hours expended on field operations and other tasks related to crop production amounted to only 25 per cent of the total farm labor hours expended on all farm activities (Table 43). As farms increased in size there was an increase in the percentage of the total farm labor hours that were expended on crop production. This increase in amount of labor used was in relation to the greater emphasis that was placed on crop production on the larger farms.

Livestock Production

The labor hours expended on livestock production amounted to an average of 41 per cent of the total farm labor hours for all farms (Table 43). In the small farm size-group, where livestock production was often a relatively more important part of the farm business, 46 per cent of the total farm labor hours were used on tasks which related to livestock production. As farms increased in size the livestock enterprise generally decreased in importance relative to the whole farm business; on farms with 561 or more acres of cropland 36 per cent of the total hours of labor was used on livestock production.

Miscellaneous Tasks

For all farms, an average of nine per cent of the total hours of farm labor was spent on tasks related to the farm management; 21 per cent on tasks related to farm maintenance; one per cent on exchange labor; and three per cent on off-farm labor (Table 43). The percentage of the total hours spent on farm management increased as the size of farm increased. Farm maintenance and exchange labor required about the same percentage of the total hours on all farm size-groups. Off-farm labor required a larger percentage of the total hours on the smaller farms.

LABOR EFFICIENCY

Relationship between Labor Supply and Labor Use

In agricultural production the amount of labor used is not uniform from week to week. In the winter there are storms which temporarily stop all but the most necessary yard chores. In the summer each heavy rain will temporarily stop all field work. During all these days the family labor force is not fully employed. Therefore, it is to be expected that the supply of available hours of labor on the farm will exceed the total number of hours spent on the various tasks related to the farm business. In the analysis of the data on farm labor use, all the time that was spent on farm work was considered productive hours of labor.

The percentage of the total supply of available labor hours that was used on productive farm activities is illustrated in Figure 2. For all farms an average of 67 per cent of the total farm labor hours per farm was used in productive farm work. As the size of farm increased there was a decrease in the percentage of the total labor hours per farm that was used. In the small farm size-group an average of 74 per cent of the total hours of labor per farm was used; in the largest farm size-group an average of 57 per cent of the total hours of labor per farm was used.

Hours Worked per Man Equivalent

For all farms visited an average of 2,337 productive hours of labor was contributed per man equivalent (Table 44). As farms increased in size there was a slight decrease in the amount of productive labor contributed per man. This decrease would be influenced by the reduction in the amount of labor required per acre for crop production and per animal unit for livestock production on the larger farms.

Table 44.- Hours of Productive Labor Used per Farm and Hours of Productive Labor Contributed per Man Equivalent According to Size of Farm, 143 Farms, Morris and Rhineland Municipalities, 1951-52

	: <u>Size of farm (acres of cropland)</u> : All					
	: 50-120:121-240:241-400:401-560:561 plus:farms					
Number of farms	24	42	35	20	22	143
	- hours -					
Total hours of productive labor used per farm	3,308	3,791	4,414	4,386	5,338	4,183
Man equivalents per farm	1.29	1.51	1.82	2.01	2.61	1.79
Hours productive labor per man equivalent	2,564	2,511	2,425	2,182	2,045	2,337

Because the length of work day on the farm may range from three or four hours per day during slack periods of time to 12 or 16 hours per day during the seeding and harvesting periods, it is difficult to compare the number of hours worked per week on the farm to the number of hours worked per week in industry for any specific time of the year. For the entire year, however, each man equivalent worked an average of approximately 45 hours per week on all farms studied. As farms increased in size there was a decrease in the number of hours worked per week by each man. On farms with less than 121 acres of cropland each man worked approx-

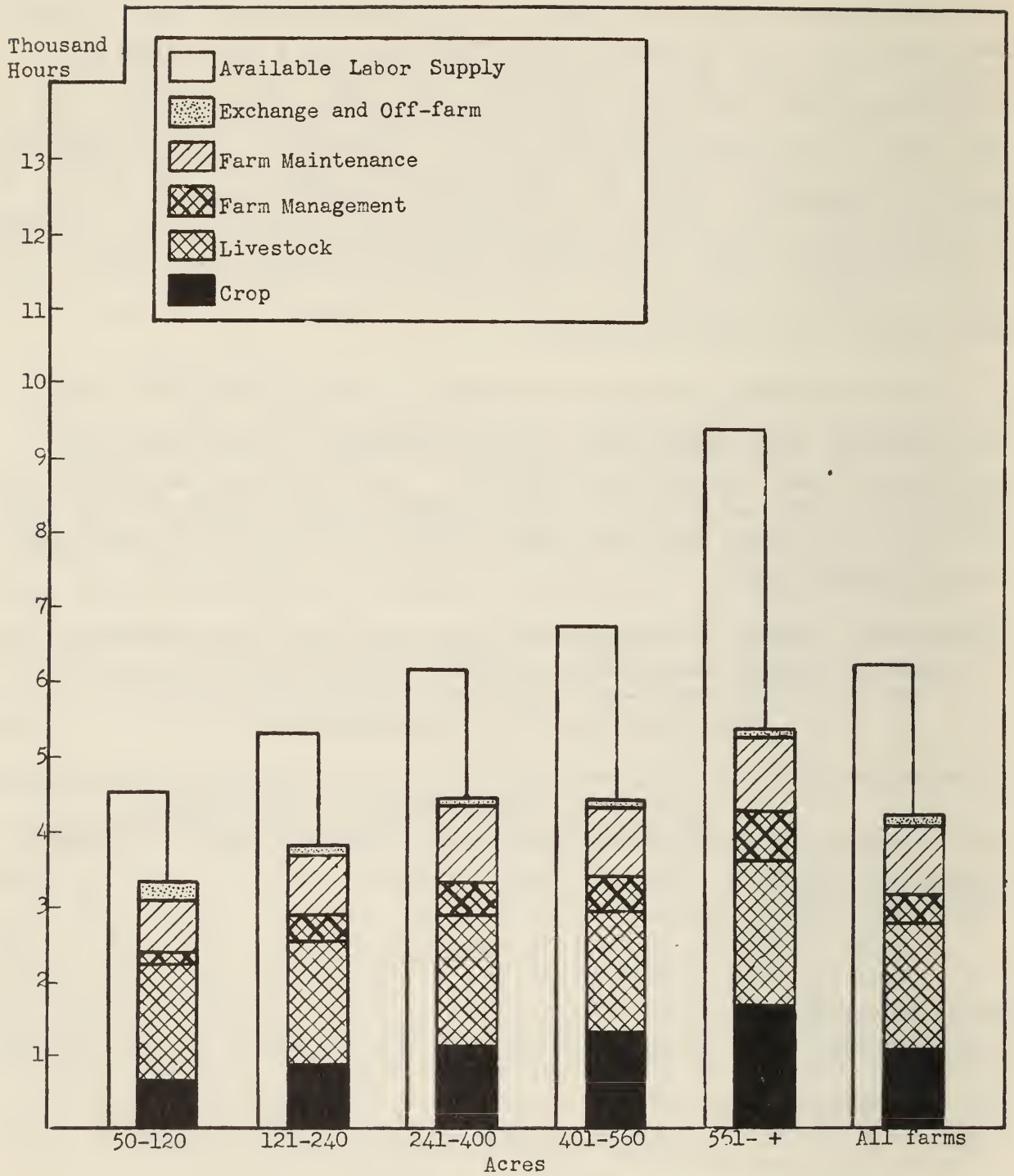


Figure 2.- Relation between Available Labor Supply and Amount of Labor Used on the Various Farm Activities According to Size of Farm

imately 50 hours per week; on farms with 561 or more acres of cropland each man worked approximately 40 hours per week.

Management Problems

Many problems confront the farm operator in determining the farm organization which will maximize the net returns with the given production resources at his command. Agricultural production resources are made up of land, labor and capital. Each of these resources is, within limits, substitutable for another. The combination of these resources that will yield the highest returns for any individual operator will depend upon the availability and cost of each resource.

The most efficient farm organization in the survey area appeared to be one where the emphasis was placed on crop production. Within the crop enterprise there is considerable choice in kind of crop to grow. When selecting the most suitable crop it is important to consider the availability of land and labor. With a large acreage and limited labor supply the common grain crops would yield highest returns for labor used. With a limited land area and large labor supply the special crops would utilize the labor more fully and yield higher returns for labor.

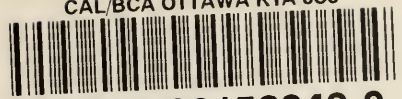
The type and intensity of the livestock enterprise will depend upon the class and amount of available labor and to what extent the livestock competes with field crops for labor use. A beef cattle enterprise requires a large amount of labor only during the winter months. A dairy enterprise requires considerable labor during the summer but much of the help may often be supplied by the women and teen-age children. In many cases the operator's wife and daughters carry on a successful poultry enterprise with little help from the men.

When dealing with labor efficiency on the farm it is important to consider that the amount of land and capital used in relation to the amount of labor used generally changes with the length of time that the operator has been on the farm. When an operator is getting established his cash resources are usually at a minimum. During the first few years of operation it is often necessary to use a limited amount of land and machinery and maximize the use of the family labor force. Later, when he is in a more favorable financial position, the size of farm can be increased and more machinery substituted for labor.

Farming is in competition with other industries for the use of labor. Any innovation that increases the productivity of farm labor will make farm operations more attractive to the individual operator and improve the competitive position of farming among other industries. It is the responsibility of the farm operator to use his resources in the way that will maximize the returns with minimum labor.

SUMMARY

1. The area under survey is the Morris and Rhineland Municipalities, situated in the south-central part of the Red River Valley of Manitoba. The topography is remarkably level. The soils, which have been developed on a heavy lacustrine plain, are black earths and range in texture from medium loam to heavy clay.
2. The climate of the area is generally more favorable than that prevailing over the eastern sections of the Prairie Provinces and is suitable for such crops as sugar beets, corn and sunflowers as well as the common grain crops and types of livestock found in Manitoba. The frost-free period ranges from 130 to 140 days. Precipitation averages from 19 to 20 inches per year with eight to nine inches falling during the growing season.
3. The study is based on labor use records for the year October 1, 1951 to September 30, 1952, obtained from 155 farm operators.
4. In size, farms averaged 342 assessed acres with 94 per cent improved. Of the cultivated land 75 per cent was in grain crops; three per cent in special crops such as sugar beets, sunflowers and corn; five per cent in legumes, grasses and improved pasture; and 17 per cent in summerfallow. Some cattle were kept on about 95 per cent of the farms. Hog production was a sideline activity. Poultry production was an important enterprise on many farms; several flocks consisted of 500 or more birds.
5. For the most part the operator and his family supplied the labor. The total labor supply for the year of the survey averaged 1.79 man equivalents per farm for all farms. Of this total, the operator supplied 0.93 man equivalents and other members of the family supplied 0.71 man equivalents.
6. Most of the farms were fully mechanized and several farms had two or more tractors. Almost all grain in the area was swathed and combined. The average investment in machinery was \$6,363 per farm or \$19.82 per acre of cropland.
7. Time required to produce the various grain crops in 1952 on land which had been cropped the previous year ranged from 3.00 to 6.05 man-hours of labor per acre depending upon the kind of grain and size of farm. Of the special crops, sugar beets required 48.56 man-hours per acre, sunflowers 5.80 man-hours, and corn 10.64 man-hours per acre. Summerfallow, which was calculated separately and based on the 1951 acreage and tillage operations, required from 1.90 to 3.58 man-hours of labor per acre depending upon size of farm.
3. As size of farm increased there was a decrease in the amount of labor required per acre for all operations involved in the



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production of the grain crops and tillage of summerfallow.

9. During the year of the survey the weather was generally favorable for field working conditions. The amount of labor used for field operations in the seeding season was estimated to be about the same as would be required in an average year. For the summer and harvesting seasons, slightly less than the average amount of labor was required.

10. In 1952 the average grain yield on the visited farms was 18.7 bushels per acre for wheat, 40.4 bushels per acre for oats, 26.8 bushels per acre for barley, and 8.0 bushels per acre for flax. Considering these grains collectively, the yield for 1952 would be about the same as the long time average yield for the area.

11. Time required per animal unit for livestock production amounted to an average of 78 hours of labor for horses, 212 hours for cattle, 137 hours for hogs, and 258 hours for poultry. As the cattle and poultry enterprises increased in size there was a decrease in the amount of labor required per animal unit.

12. Of the total hours of labor spent on all work related to the farm business 25 per cent was used on crop production, 41 per cent on livestock production, and 34 per cent on miscellaneous farm tasks.

13. From October 1, 1951 to September 30, 1952, on the average each man equivalent worked 2,337 hours per farm. This number of hours would amount to approximately 45 hours per week for the entire year.

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